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STURM'S REFLECTIONS.

AUTUMN.

R. Westall, R.A. del. W. Greatbatch sc.

But if I leave behind me fruits of justice charity and holineſs. EVENING, Oct. 10.

LONDON:
PUBLISHED BY JOHN SHARPE,
DUKE STREET PICCADILLY.
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REFLECTIONS

ON

THE WORKS OF GOD,

AND ON

HIS PROVIDENCE

IN THE

REGIONS OF NATURE,

AND IN

THE GOVERNMENT OF THE UNIVERSE.

FROM THE GERMAN OF

CHRISTOPHER CHRISTIAN STURM.

A New Translation.

AUTUMN.

LONDON:
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JULY.

1. Foreign plants.—2. The transformation of caterpillars.—3. The silkworm.—4. The rainbow.—5. Birds' nests.—6. Pleasures derived from the contemplation of nature.—7. Flower garden.—8. Storms.—9. Ants.—10. Hail.—11. Thunder storms.—12. Primitive constitution of the earth.—13. Changes of the moon.—14. Mineral waters.—15. Continual activity of nature.—16. Utility of meadows.—17. Morning twilight.—18. Pleasures of the country—Evening twilight.—19. The May fly.—20. Nothing perishes in nature.—21. Diversity of climates.—22. Peculiar properties of the sea.—23. Variety of tints observable in flowers.—24. Intense heats of summer.—25. Animal instincts.—26. The human countenance.—27. Attraction of bodies.—28. Different effects in nature produced by the same cause.—29. Diseases of plants.—30. Means of subsistence that nature provides for animals.—31. Variety in the structure of mankind.

the forest which shelters me from the rays of
the sun, charms me also with the ſongs of the birds,
which nestle beneath its branches, —
6th Day.

JULY.

DRAWN BY R WESTALL R.A. ENGRAVED BY JOHN PYE. PUBLISHED BY
JOHN SHARPE DUKE STREET, PICCADILLY.
NOV 1.1823.

STURM'S REFLECTIONS.

JULY 1.

FOREIGN PLANTS.

All our corns and a great number of our vegetables came originally from foreign countries, and principally from warmer climates: the greater part have been translated from Italy, which received them from the Greeks, and these, again, from the east. When America was discovered, a great number of plants and flowers unknown in the eastern hemisphere were transplanted to Europe, and have flourished exceedingly: in England particularly the plants of North America have been most successfully cultivated, and still continue to be so.

Those various species of corn which are most used as wholesome food, both for men and animals, are called grass plants: although they now cover our fields, they are nevertheless foreign to our climate. Rye and wheat are indigenous to Little Tartary and Siberia, where they still flourish without culture: as for barley and oats, we know not from whence they come; they requiring cultivation convinces us that they are not natives of our country. Rice is the indigenous production of Ethiopia, from whence it was at first transported to the east and afterwards to Italy: in the beginning of the last century it was introduced into America, and now large quantities are annually imported by the European countries from the western hemisphere. Buckwheat came originally from Asia: during the time of the crusades it became known in Italy and Germany.

The greater part of our greens and vegetables have the same origin. Borage comes from Syria, cress from Crete, cauliflowers from Cyprus, and asparagus from Asia: we are indebted to Italy for the chervil, to Spain and Portugal for dill, and to the Canaries for fennel: garlic is the production of the east, and chives and shalots of Siberia, and radishes of China: kidney beans came originally from the East Indies, and the gourd from Astracan; lentils from France, and potatoes from Brazil: tobacco was found by the Spaniards at Tobago, a province of Yucatan, in America.

The chief ornaments of our gardens, the finest flowers, are also the production of foreign countries: Jessamine was originally brought from the East Indies; Spanish alder from Persia; the tulip from Cappadocia; the narcissus from Italy; the lily from Syria; the tuberose from Java and China; the pink from Italy; the asters from China, &c.

Let us meditate with gratitude and joy upon these numerous gifts of Heaven. How bountifully has the Almighty provided for our happiness and our pleasures, in rendering the most distant countries tributaries to us! But let us consider a little the constitution of the globe we inhabit: there is constantly a universal transplantation of rare animals and plants from one place to another, and this change will not cease until the world itself shall be dissolved.

In whatever clime it shall please thee to transplant me, O Lord! may I make it my constant aim to bear fruits useful and beneficial to my fellow creatures, till at last I shall arrive in those regions of bliss where there shall be no vicissitudes, neither sorrow nor pain!

JULY 2.

THE TRANSFORMATION OF CATERPILLARS.

THE transformation of caterpillars into butterflies is one of those phenomena which have great claims upon our attention. The preparatory state previous to this change is very surprising: the caterpillar having cast its skin three or four times, it gradually sinks into a state of torpor, assuming a form that bears no resemblance to a living creature. The insect remains in this state one, two, or three weeks, sometimes even ten months, until its transformation is completed, when it makes its way out of its shell, and soars in the air as a beautiful butterfly.

There are two kinds of butterflies: the wings of the one kind close perpendicularly, those of the other horizontally; the former fly during the day, the latter at night. The caterpillars from which the nocturnal insects (moths) issue spin themselves a cone as the time approaches for their change, or else they bury themselves. Those which are, properly speaking, butterfly caterpillars suspend themselves in the open air, to a plant, a lath, a wall, or some such thing: to effect this they spin a very fine web, in which they envelop themselves; they then drop themselves down, and are suspended with their head inclining a little upwards. Other kinds attach themselves by a thread passed round the middle of their bodies, and which is fastened at each end. In one or the other of these ways all butterflies prepare for the grand transformation they are about to undergo. Thus both butterflies and moths may be said to bury themselves alive, and prepare quietly to await the end of their caterpillar state, as if foreseeing that, after a short repose, they should receive a new existence, and appear under a more beautiful form.

The death and resurrection of the just cannot be better typified than by a comparison with this change of the caterpillar: to the true Christian death is but a sleep, a state of calm repose after the troubles and miseries of this world, a momentary torpor, a transitory privation of life, from which they shall rouse and awake to a life of glorious immortality. What is a caterpillar? —A crawling insect, blind and despised, which, while it drags on its joyless existence, is exposed to an infinity of accidents and persecutions. Has man a better fate in this world?

The caterpillar prepares for its change with the greatest care. In like manner the just conduct themselves: having death always before their eyes, they await with tranquillity and joy the happy instant which shall open to them the prospect of a better world.

The sleep of the caterpillar is not lasting: it is but the forerunner of a state of perfection. Formerly it crawled on the ground: now it soars aloft, clothed in the loveliest form and adorned with the most brilliant hues; no longer blind, it enjoys a thousand pleasures unknown to it in its former state; instead of the most homely food, it now wanders from flower to flower, extracting delicious honey, and sipping the rosy dew. In all this I see a lively picture of the resurrection of the just: their weak and terrestrial frame is exchanged for one of glory: while enveloped in their earthly coil, they were subject to passions, and occupied with sensual groveling objects; but, after their resurrection, their body shakes off its earthly particles, and, light and glorious, it ascends above the stars, and at a glance embraces all nature. The souls of the virtuous rise towards the heaven of heavens; they approach the dwelling of the Omnipotent, and, wrapped in sublime meditations, contemplate their Maker face to face: before their death truth was concealed from them; now it appears clearly to their view, and they can support its dazzling brilliancy. Their bodies being now spiritualized, glorified, and incorruptible, they no longer demand grass food to satisfy their thirst and hunger; other sensations compose their felicity; a pure joy swells their heart, and celestial food forms henceforth their support, What an important lesson does this furnish! If, my Christian Friend, such is the happy revolution you are to expect, prepare duly for it. If your present state is imperfect and momentary, consider that it is not final, and that the short time you have to pass here below is as nothing when compared with eternity.

JULY 3.

THE SILKWORM.

The republic of caterpillars, which are divided into two general classes, that is to say, into moths and butterflies, are subdivided into divers families, each of which has its peculiar properties and character. The name given to one of these families is that of silkworm: this caterpillar is composed like the others, of several movable rings, and it is provided with twelve feet, with which it moves or fastens itself; it has two rows of teeth, which do not move up and down like ours, but from right to left; with these it tears, cuts, and craunches the leaves upon which it feeds; down the back of the insect a vessel is plainly distinguished through the skin, swelling and sinking alternately, acting as the heart does in other animals; on each side the silkworm has nine little apertures, which answer the purpose of lungs, assisting the circulation of the chyle and nutritious juices; under its mouth it has two openings, through which it exudes the drops of the gum that its bag contains; these may be called the storehouse, constantly supplying the matter with which it forms its silk. The gum which exudes from these two openings takes the form of two threads, losing immediately all fluidity, acquiring a consistency sufficient to envelop and suspend the caterpillar; the two threads are united into one by the two fore paws. This double thread is not only very thin, but also very strong, and is of an astonishing length: the silk thread of every cone is nearly five hundred yards long; and, as this thread is double in its whole length, one thousand yards is the actual quantity of silk one worm will spin: the weight of this silk is two grains and a half only.

The life of this insect in its worm state is very short: it passes, however, through several stages of existence, approaching by degrees its state of perfection. When it is first hatched it is a very small black worm, the head being conspicuous from its peculiar depth of colour. In a few days it assumes an ashy tint: this in the course of a little time becomes soiled and wrinkled, and then the insect throws it off; by degrees it increases in size, and its skin is of a greenish white: this arises from its feeding upon green leaves. Some short time after this, the length of which varies according to the degree of heat and the quality of its food, it ceases to eat and falls asleep, in which state it remains for two or three days; it then appears greatly agitated, and exerts itself to so great a degree in throwing off its skin that it becomes of a reddish hue; at length it accomplishes this end, and throws it aside with its feet. This is the third dress it has appeared in: at the expiration of three weeks or a month it begins to eat again; and, so greatly is its head, colour, and form altogether altered, you would hardly know it as the same creature. In the course of a few days, however, it falls into a second lethargy, at the conclusion of which it again assumes a new dress: after this it resumes its appetite for a season; and then, again renouncing all food, it prepares itself a retreat, and with its silken thread envelops itself completely. In this tomb it quietly reposes; and, at the end of a fortnight, it would pierce it in order to get out, if the cave were not exposed to the rays of the sun or put into an oven: the insect is killed by these means. The cones are then thrown into hot water, in which they are gently agitated by a little broom, which process in time loosens the ends of the silk: it is then wound off upon reels constructed for that purpose.

Thus we see that it is to a worm, a caterpillar that we are indebted for our most luxurious clothing: by means of that liquor which it ejects beneath its mouth it furnishes us with silks and velvets. This reflection should teach us humility. What, shall we be proud of the silk which covers us? Let us consider to what we are indebted for it, and how little we ourselves contribute to that dress of which we are so vain. Let us reflect that the most despised objects have been produced for the advantage and ornament of man: a worm, which we scarcely deign to honour with a look, becomes a blessing to a whole province, a considerable object of commerce, and a vast source of riches. The inspection of this insect should cover with shame a multitude of persons: many people, it is true, resemble it in the early stage of its existence; they eat, they sleep, and change their dress; but how few are there who, like it, render themselves useful to the world by their labours!—Let us henceforth consecrate our talents and abilities to the welfare of our fellow creatures; and let us labour without ceasing to promote their happiness.

JULY 4.

THE RAINBOW.

WHEN the sun darts his rays upon the drops of water which fall from the clouds, when our backs are turned to the sun and we face the clouds, then we can discover a rainbow. We must consider the drops of rain as little transparent balls, upon which the rays of light are twice refracted and once reflected. From hence arise the colours of the rainbow; they are seven, and follow each other in the following order:—red, orange, yellow, green, blue, indigo, and purple. The darkness of the sky behind the bow gives it its peculiar brilliancy. The drops falling constantly, we every instant see a fresh rainbow; and, as every spectator has his particular position, from whence he observes this phenomenon, no two persons see the same rainbow: this beautiful object can only continue so long as the rain falls.

If we consider the rainbow merely as one of the phenomena of nature, it is undoubtedly one of the finest spectacles which we can behold; it presents one of the most beautifully coloured objects which the Creator has exposed to our view; but when we look upon it as the symbol of God's grace and alliance with us, we find it a subject for more edifying reflection.

There can be no rainbow if the clouds extend over the whole of the visible firmament; therefore, whenever we see it we may conclude there will be no deluge, since the rain would in that case fall equally from all parts of the heavens: when the clouds extend over one half of the horizon and the sun shines on the other, we naturally expect a return of fine weather. In order to produce a rainbow, clouds and sunshine must be visible at the same moment: we should not see its beautiful colours if the sky were bright behind it; and hence the advantage of dark clouds, heightening its effect to a degree of brilliancy perfectly enchanting: neither could there be such a display of colour without the action of the sun and the refraction of its rays. This object naturally leads us to the most pious reflections.

When we behold the magnificent bow in the heavens, should we not exclaim—"How great is the majesty displayed by the Almighty in all his works! How marvellous is the greatness, the goodness he shows forth towards his creatures! How do we see that God remembers his promises! Let all creatures prostrate themselves, and adore him who so benevolently displays his never ending love: he has said the world shall not again be drowned, and he spreads forth his bow to remind us of his gracious covenant. Let his name be blessed now and for ever. Amen."

But another consoling reflection arises from the contemplation of this object. The sun is behind me and rain is before me: such is the image of my life; oftentimes my face is bathed in tears, but at the same time the sun of justice, bearing healing on its wings, rises behind me.

JULY 5.

BIRDS' NESTS.

THE structure of the nests of different birds unfolds to us a number of extraordinary particulars, interesting to a reflecting mind and to a mind desirous of information. Who can withhold his admiration from those little edifices, composed of so many different materials, collected with so much choice and labour, constructed with so much industry, elegance, and neatness, without any other tools than a beak and two feet? That man should be able to construct magnificent edifices according to the rules of art is not surprising, if we consider that he is endowed with reason, and that he possesses many instruments to assist him in working his materials; but that a bird, with only its beak and its feet, should display so much ingenuity in the construction of a nest is truly astonishing!

Indeed this operation calls for a minute investigation: nothing can be more wonderful than the nest of a goldfinch or chaffinch; the interior is lined with cotton, fur, and fine silky threads; the external part is covered with thick moss, and, in order that the nest should not be conspicuous or attractive to the eyes of passers by, the colour of this moss resembles that of the bark of the tree in which it rests. Some nests are composed of hair, down, straw, &c. curiously interwoven. The blackbird and lapwing, having completed their nests, line them with a thin coat of mortar, which unites and gives firmness to the outward part: over this mortar, while wet, they place layers of down and moss, which forms not only a soft but a warm receptacle for the young birds when hatched. The nests of swallows are unlike those of all other birds; they are composed apparently of mud, or rather of a clayey cement, bound together, at times, by straws and hay, and which they concoct in the following manner: they commence their operations by one which appears a mere amusement; they skim lightly over the water, dipping their breasts lightly in its yielding surface; they then repair to the spot where they have discovered dust suited to their purpose, and, by shaking their wings and hovering over the place, they moisten it to the degrees necessary for giving it a proper consistence, working it with their bills: with this mortar they build a warm and comfortable nest.

But the nests which most call for our admiration are those of a species of titmouse found in the East Indies, which are suspended to the end of the branches of trees in a most curious manner, so that they are secured from the attack of many animals and insects. Every bird has a mode peculiar to itself of forming its nests, and a mode of life peculiar to itself: some build their curious edifices in houses, some in trees; others conceal them in the grass or burrow in the earth, &c.; but each chooses that place best suited to its means of existence and security.

Such is the wonderful instinct displayed by birds in the structure of their nests; and we must, I think, no longer look upon them as mere machines, since their labours, industry, and skill tend to produce a certain end: they make a hollow nest, almost like a semicircle, that it may retain the heat; this nest is outwardly composed of coarse materials, calculated to give it strength, as well as to resist the inclemency of the weather and the attacks of the insect tribe; it is lined with moss, wool, and feathers, in order that it may be soft and warm for their little ones. Is it not something more than instinct which teaches birds to build their nests so ingeniously? Who has informed them that they shall produce eggs, and that a nest must be built to hold their little ones and keep them warm?—that this nest must be of a certain size, in order to accommodate a certain number of tenants? Who has taught them the exact time that they should begin their nests, so that they shall be ready to receive their eggs? All that has or can be said upon this subject of impenetrable mystery is quite unsatisfactory; but, of whatever description it may be, and of whatever nature the faculties of birds may be, they are at least derived from infinite power and wisdom; and, as birds are not capable of being acquainted with their Creator, let us make use of the reason with which he has endowed us to increase continually in gratitude towards him, and employ our understanding to his praise and glory.

JULY 6.

THE NUMBERLESS PLEASURES TO BE DERIVED FROM THE CONTEMPLATION OF NATURE.

To whatever part of the creation we direct our eyes, we everywhere find something to interest either our senses, our imagination, or our understanding.

The whole of nature is filled with a multitude of agreeable objects, which impart to us a succession of varied pleasures; our taste for variety is always excited and always gratified. In the morning and at noonday I am cheered by the rays of the brilliant sun, and the night enchants me with its star-spangled canopy.

Nature is ever at work to surprise us with fresh pleasures: the smallest worm, a leaf, a grain of sand presents us with objects of admiration; and we must be blind indeed not to be struck by this diversity, and more than insensible if we neglect to acknowledge it as the gift of a benevolent Creator.

The same spring which waters the valley lulls me to sleep, pleases my ear, and quenches my thirst: the majestic forest which shelters me from the scorching rays of the sun charms me, at the same time, with the melodious songs of the birds which nestle beneath its thickly woven branches: those trees which bloomed a short time since in all the flowery pride of spring will soon enrich me with autumn's bounteous stores; and those fields of golden waving corn will yield abundant harvests.

Nature presents us with no object, whether it ranks among the agreeables or usefuls of life, which may be properly termed so in one respect only: her tender care has clothed the fields with green, as the colour most agreeable to our eyes; but, in order to give us more extensive pleasure, she has varied its tints and shades to a degree beyond all definition. And how gradual is the progression from the palest hue to the deep tints of the yewtree! What a varied picture do the woods, the meadows, the corn fields, and the gardens present!—Composed of tints so numerous, yet all so blended that the enchanted eye wanders delighted amidst the lovely scenery.

Every month presents us with new and different plants, the one succeeding the other so immediately that there is no vacancy in the vegetable kingdom.

But to whom are we indebted for the numerous and varied presents of nature? Who is he that provides so munificently for our wants and pleasures? Go, ask all nature; and the hills and the valleys will tell thee: the earth declares it; and in the skies, as in a mirror, we can contemplate it: storms and tempests declare it: the voice of the thunder, the rainbow, snow, hail, and rain all display His bounty and wisdom: the verdant meadows, the golden fields, the wood-crowned mountains, the blushing orchards, the blooming gardens, all bear the stamp of Omnipotence: the birds declare the power of the Almighty in their varied songs: the flocks and herds, the stag in his forest retreats, the earth-crawling worm, the monarch of the deep, the enormous whale, the terrific crocodile, the majestic elephant, bearing on his back, in towers of wood, the lord of this nether world, decidedly and uncontradictingly declare there is a God, whose attributes are omnipotence, omniscience, and omnipresence!

And canst thou, my Friend, be deaf to this voice of nature? O thou man! who art endowed with the happy faculties of beholding and admiring these works of thy Creator, come, and in the face of his creatures render to him the homage of gratitude and adoration: shut not thy heart against the operation of his holy Spirit: look around thee: let the blessings which surround thee excite in thee feelings of the most heartfelt gratitude. No pleasures are so powerful, none so satisfying as those which arise from the contemplation of the works of God. The more thou dost study the beauties of nature, the greater will be thy conviction of the tender mercies of the Almighty Creator of all things.

JULY 7.

FLOWER GARDEN.

COME, let us contemplate the beauties of a flower garden. Art and nature have combined to render this little spot a theatre upon which the most lovely flowers are exhibited; and what would it be without culture?—A wild desert, covered with thorns and thistles. And such would be the youth of man, if neglected and uncultivated; but when education and discipline united have weeded the soil and scattered around the seeds of good advice, then does youth blossom like the lovely flowers of spring, giving promise of the fruits of summer.

Behold the night violet, which, as evening approaches, perfumes our gardens with its odoriferous sweets, overpowering every other. Yet it possesses no beauty; scarcely does it resemble a flower: it is small, and its colouring so nearly resembling a dull green that it is scarcely distinguishable from the leaves. Modest and without any pretensions to beauty, it would be totally overlooked, were it not discovered by its sweetness: like a person of homely features, but endowed with a considerable degree of mental perfections, it strikes not the eye, but must be known to be valued. The good works of the just may be performed in secret, but their odour will discover them.

In the pink beauty and perfume are united; and it is, without doubt, the most perfect of all flowers: it approaches the tulip in its colouring, and surpasses it by the multiplicity of its leaves and petals, and by the elegance of its form. A small bed of pinks will shed its perfume to a great distance. This flower is an emblem of a person who unites mind to beauty, and who, by their proper use, conciliates the love and respect of his fellow creatures.

Let us now consider the rose. Colour, form, and perfume are all united in this lovely flower;

but its beauty is transitory, and it appears to fade sooner than other flowers. From this lovely production, this masterpiece of nature, persons gifted with beauty of form and countenance may acquire a useful lesson, teaching them to refrain from pride and vanity; for their loveliness is like that of the rose, fleeting and momentary.

There is something melancholy in the contemplation of a flower garden at this season of the year: nature's fairest productions are fading hourly away, and we must not look for their renewal until the revolving year returns; yet should we not complain that Providence has not bestowed durability upon flowers. The world is a great theatre, upon which we are not always to see the same actors: it is but just that, when one has played his part, another should succeed; this change forms a necessary part of the diversity of the works of the Almighty; besides which, we are alive to the charms of novelty, and therefore it constitutes a part of our happiness that one object should be succeeded by another. If flowers retained their beauty throughout the year, they would not impart to us the delight they now do: their absence makes us long for their return; if they were constantly before us, we should soon be weary of them. The constant variation and succession of all terrestrial objects constitutes one of the chief sources of our happiness.

Such is the felicity of the world: all is vanity—all flesh is like grass, and the glory of man like the flower of the field; the grass dies, and the flower falls. The lilies and roses of a beautiful face fade like the flowers of the field, and death destroys every trace of them. Let us therefore show wisdom in placing our happiness upon the things of an eternal world. Wisdom, virtue, and the treasures of Christianity are lasting: these are the inexhaustible source of a never failing happiness.

JULY 8.

DESCRIPTION OF THE ORDINARY PHENOMENA OF STORMS.

HOWEVER formidable the phenomena of storms and tempests may be, they display so much of the grand and the sublime that they well merit an examination of their effects. This examination is the more necessary, because it frequently happens that terror prevents us from considering with sufficient attention this majestic spectacle.

When a thunder cloud, or collection of vapours highly electrified, approaches a building or another cloud not so completely electrified as the former, the fluid in the surcharged cloud discharges itself into the less electrified; and hence proceeds the flash of lightning which we see in such cases, and the formidable report of thunder that we hear. The fluid is sometimes seen in a single flash; at other times it shoots in numerous flashes in a zigzag direction; and the report which succeeds proves that the vapours which produced the lightning occasioned, by their sudden ignition, an extraordinary expansion and agitation of the air. The discharge of every electric spark is attended with a report; and thunder is produced on the same principle, though it may actually be composed of several reports, or multiplied by repeated reverberations.

There usually intervenes some time between our seeing the flash of the lightning and our hearing the report of the thunder; and this circumstance enables us to judge of the distance at which we are removed from the phenomena; for, as sound travels about one thousand feet in a second of time, if twenty seconds elapse between the flash and the report, the thunder is generated at a distance of twenty thousand feet from us. Thus light travels much faster than sound.

The lightning does not always dart forward in a right line, but frequently in a zigzag course, and produces an explosion when near the earth; and in this case the electric fluid never fails to strike. When the ignited fluid bursts, like an ill charged bomb, before it arrives at the earth, its explosion is harmless; but when it strikes the ground or a building before it discharges itself, the effect is dangerous: a very small portion of the earth is, however, only occupied by buildings, and therefore many thousand innoxious flashes may be discharged in one season.

The course of lightning is peculiarly uncertain, depending partly upon the direction of the wind, the quantity of vapours with which different parts of the atmosphere are charged, and other causes. If we admit that the oxygen or hydrogen of the clouds or vapours concentrates when two clouds pass over or near each other, the hydrogen or oxygen of the one cloud rushing into the other, or into the earth greatly excited by evaporation, a union of these two chemical principles would create the usual light, heat, and explosion which are the common phenomena of a thunder storm. Perfect conductors, as thunder rods on buildings, disperse the fluid; but when the double rush comes in contact with an imperfect conductor, it is torn in pieces by the explosion: and we may thus judge of the force of lightning by the effects it produces, either in consuming combustible substances, melting metals, calcining the bones of animals without injuring their flesh, or pulverizing rocks and stones, and overthrowing trees and stately buildings.

Contemplate, Christian Reader, all the effects of this wonderful phenomena with due attention. You perceive a black cloud: it descends to the earth; but it is God "who boweth the heavens and cometh down with darkness under his feet."—(2 *Samuel,* xxii. 10.) Tempestuous winds arise, driving clouds of dust in every direction; but the Almighty himself "rides on the whirlwind and directs the storm." Before the splendour of his majesty the clouds are parted asunder, the lightning flashes, the thunder roars, and the hail descends. "The sound that goeth out of his mouth he directeth under the whole heaven, and his lightnings under the earth: after it a voice roareth; he thundereth with the voice of his excellency; great things doth he, which we cannot comprehend."—(*Job,* xxxvii. 2—5.) But if his awful lightnings sometimes strike terror into his creatures, his boundless hand is nevertheless extended to distribute among them abundance of food in due season.

JULY 9.

THE ANT.

ANTS, like bees, are considered as a commonwealth, having a regular government, constitution, and laws. Their residence is divided into distinct apartments, all of which are approached by separate ways, but which all communicate with each other: with much industry they collect materials, such as grass, straw, and sticks, for constructing their habitations, which are finished with considerable art, and so constructed that the water runs off and the insects are in little danger of perishing by inundation. They tend their eggs with peculiar solicitude, conveying them from place to place according to the temperature; and their young are carefully removed from every thing that might hurt them. With painful toil they collect provisions, which are consumed immediately; for they have no occasion for food during the winter, which they pass in a torpid state*. As soon as the young have crept from the egg, the parents may be seen busily employed in feeding them, an operation extremely troublesome.

A colony of ants has usually several habitations, and conveys its young from one dwelling to another, when desirous of rendering it more populous. As the weather is hot or cold, dry or wet, the ants may be seen removing their larvæ nearer to the surface of the earth or farther from it: in fair weather they bring them very near the surface, and sometimes place them in the sunshine after rain, or in the cooling dew after drought; but, on the approach of night, rain, or cold, they again take up their offspring, and carry them so low down into the earth that you are sometimes obliged to dig more than a foot depth before you reach them.

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* And, indeed, if they did not so sleep during the winter, they could find no provisions, but would be confined at home by wet and pinching cold. Their provisions are all sorts of animal food; for ants are carnivorous. I have seen thousands of them tearing a dead bird to pieces and devouring it.—*Translator*.

The common ants are divided into three classes, like bees—males or drones, females, and labourers, which are of neither sex: the two former have wings; the latter are without wings. The eggs of the females are, when laid, so small as to be almost imperceptible; in a few days little worms issue from them, and grow with great rapidity till they become considerably larger than the ants themselves: these larvæ or grubs, being without legs and of an oblong form, are erroneously called eggs; in a short time they change into aureliæ, and the latter into perfect ants. Most of the females, after depositing their eggs, perish, together with all the males.

Of ants there are several species. The wood ants reside in woods and groves, without injuring meadows; and of these there are two sorts, one red and the other black: some choose their residence in dry places, and prefer such as are stocked with the relics of birch and pine trees, in the roots of which they establish themselves; others select the stumps of trees that have been felled, in which they form their dwellings, at such a height above the earth as to be out of the reach of its humidity: they convert the cavities of the trunk into chambers, which they cover with bits of straw and other materials that may shelter them from the rain and snow. The same difference of colour prevails among the field ants, which, however, are smaller than the former, and build their nests either among corn or the grass in the meadows.

These little insects are capable of affording us instruction and amusement: their economy, incessant industry, and tender care of their young are calculated to convince us of the wisdom of that Being who is their Creator as well as ours; for, my brethren, of all the works which God hath made, there is none that is not good and excellent and worthy of admiration. The ant, against which so many idle prejudices are entertained, destroys the saccharine juice which the aphis discharges upon the leaves of trees, and which is injurious to them: the ant is, moreover, wholly a carnivorous insect, and may be rendered instrumental in clearing trees of caterpillars. Ants exhale a powerful acid (denominated the formic acid), which, during the heats of summer, may be one means employed by the Creator for preserving the salubrity of the atmosphere.

JULY 10.

HAIL.

HAIL is merely frozen drops of rain, of a spherical, oblong, or angular form, but distinguished from rain by being composed of many little spherucles agglutinated together; neither are these spherucles all of the same consistence, some of them being hard and solid like perfect ice, others soft and mostly like snow hardened by a severe frost. Sometimes the hailstone has a kind of core of this soft matter; but more frequently the core is hard and solid, while the outside is composed of a softer matter. Hail is thus formed: when the first rays of the sun have warmed the surface of the earth, the heat, by separating the particles of water, renders them lighter than the air, and they ascend into the atmosphere, where they are formed into clouds; the water becomes vapour, the vapour clouds, which float in that region of the air that corresponds with their own specific gravity; but by frequent accessions of fresh vapour, these clouds become too heavy for the air to support them, and they fall in watery particles, which, coming within the sphere of each other's attraction, unite in the form of drops of water. The vapour thus transformed into a shower is heavier than any part of the atmosphere, and consequently descends to the earth, but in its descent it occasionally passes through a stratum of cold air, and drops of rain are then frozen, and fall to the earth as bits of ice: even during the intense heats of summer the upper regions of the air are exceedingly cold; for we find the summits of the loftiest mountains perpetually covered with snow, while at their bases a tropical summer prevails, and hence we can account for the phenomena of hail; but, though hail is most common in summer, it falls also at other seasons, in winter, spring, and autumn.

The calamities which hail has occasioned in some regions of the globe may be easily conceived from the following instances selected out of many:—During the war of Louis XII. in Italy, in 1510, there fell a shower of hailstones, which destroyed all the fish, birds, and beasts of the country: this storm was accompanied with thunder and lightning, and the hailstones, which were of a bluish colour, emitted a strong smell of sulphur; some of them weighed a hundred pounds. At Lisle, in Flanders, in 1586, fell hailstones of a very large size, some of which contained in their middle a dark brown matter, that, thrown into the fire, gave a very loud report. In France the ravages of hail are particularly felt. In Hertfordshire, in England, in 1697, a shower of hail fell, killing many persons who were in the fields and on the highways; their bodies were beat all black and blue; vast oaks were split, and fields of grain cut down as with a scythe.

The ingenuity of man has succeeded in averting in some cases the destructive effects of hailstorms: this is effected by placing cannon upon eminences, and discharging them before the clouds have accumulated: by repeated explosions the clouds are dissipated, and the labours of the husbandman are not blasted in a minute.

But, though hail may lay waste the fields and break thousands of windows, its ravages are compensated by its advantages; it moderates the heat of summer by the cold which it diffuses through the lower regions of the atmosphere, and dissolving it contributes to the fertility of the earth. In this also, O adorable Creator! dost thou manifest thy wisdom and goodness: even in the midst of hail storms will I praise thee; for thy hand doeth great things, and thou givest us bread in abundance.

JULY 11.

THE UTILITY OF THUNDER STORMS.

THE phenomena of nature ought always to be considered in such a light as to impress upon our minds the wisdom and goodness of God; and this duty is the more indispensable because, from our ignorance and ingratitude, we are liable to neglect it. True it is that God sometimes makes use of natural phenomena to punish the sins of man; but these particular instances do not disprove that he always proposes and has in view the general welfare of all his creatures, and of this nature furnishes us with abundant example and incontestable proofs. In this day's meditation we will confine our attention to a single phenomenon, particularly calculated to convince us of the foregoing proposition, upon which our ideas ought to be clear and intelligible, The greater part of mankind, accustomed from early infancy to pronounce the words thunder and lightning with terror, think only of the extremely rare cases in which storms are fatal to a very small portion of the universe, while they shut their eyes to the numerous and extensive benefits which, in every case, are conferred by them on mankind and the universe in general. How different would be the language of mankind were the Deity, indignant at their murmurs and ingratitude, to withdraw from them the advantages resulting from thunder storms!

Though unable to enumerate all the benefits we derive from these phenomena, the little we know concerning them is sufficient to fill our hearts with gratitude towards our great Benefactor. Figure to yourself, gentle reader, an atmosphere charged with noxious and pestilential exhalations, which are continually receiving accessions from the effluvia of innumerable putrid and poisonous substances on the earth. This air we breathe, upon it depends the preservation or extinction of our life, according to the salubrity or insalubrity of its constituent principles. The sultry heat of summer relaxes our energies —we respire with difficulty, and our spirits are less exhilarated than in cold weather; an opportune storm, however, arises and purifies the air, by dissipating its noxious principles, rendering it cool, and restoring its elasticity, to promote respiration and brace the animal functions. If these beneficial effects were not produced by storms and tempests, the noxious vapours, continually accumulating, would destroy mankind by thousands, and a universal pestilence would speedily transform the world into one vast cemetery.

Should we, then, rejoice or repine at thunder storms? Is it rational to murmur at the trifling mischiefs which they sometimes occasion, or to thank and adore the Almighty for the blessings which, upon the whole, they confer upon the earth? Add to this that men and other animals not only derive important advantages from the purification of the atmosphere from accumulated vapours by means of thunder storms, but that they are also highly beneficial to the vegetable kingdom; for the rain of a thunder storm is more serviceable to plants than that which falls at other times. These storms precipitate upon plants and vegetables the saline and sulphureous particles with which the atmosphere is charged, and this proves most excellent nourishment for them: in addition to this, innumerable multitudes of insects that devoured them are swept away and destroyed by these rains.

These considerations should moderate our excessive dread of thunder storms, a dread which too plainly shows the feeble confidence we place in God. Rather than cherish fearful ideas, let us habituate ourselves to contemplate the grandeur and sublimity of an approaching thunder storm: instead of dwelling only upon the accidents occasioned by lightning, let us reflect on the necessity and great utility of this phenomenon, and leave the direction of such matters as are above our power to Him who governs the universe with supreme wisdom and goodness: when the storm shall lour, let us, with full conviction of heart, exclaim—"'Tis thou, O Omnipotent! who commandest the thunder, and directest the winged lightnings in their course. Our fate is in thy hand: thou canst preserve and thou canst destroy: thy storms can either fertilize or desolate the fields. Great art thou, O Lord our God! and ineffable is thy power. How can we withstand thee? Or whither can we flee from the visitation of thy wrath? We are thy children! Thou art our Father! Praised, therefore, be thy name, O Lord! from everlasting to everlasting; and let all the people say Hallelujah! Amen."

JULY 12.

PRIMITIVE CONSTITUTION OF THE EARTH.

THE Creator of the earth has constituted it so that it is adapted to the production and support of herbs, plants, and trees. The mould in which vegetables grow is so compact that they are rarely blown down by the wind, and yet so loose and light that their roots can shoot in all directions to attract humidity and the nutritive juices which support vegetation; even when the surface of the ground is parched with drought, the lightness of the soil permits the humidity to ascend as through capillary vessels, that trees and vegetables may not be deprived of the requisite nourishment. The earth is, moreover, impregnated with different oleaginous and other juices, which promote the growth of plants; and that the various species of vegetables may be perpetuated, the Deity has created numerous kinds of earth, which contribute to other purposes: with one kind we make bricks and tiles for building; from another we manufacture various vessels and household utensils; from others we derive colours for painting, dying, and the composition of drugs.

The inequalities of the earth's surface are productive of great and general benefit: mountains afford a retreat to numerous animals, and they are the fittest places for a great variety of vegetables, that will not thrive in the plains; they are the magazines in which nature has deposited the metals and minerals for our use; they break the violence of the winds, they precipitate the clouds in snow and showers, and thence become the reservoirs whence the earth is supplied with water; for most of the rivers which irrigate the plains have their sources in mountainous districts.

Of the stones extracted from the bosom of the earth some are used in building houses and walls, and others for making lime and glass. We cannot enumerate the services we derive from metals; for consider only the tools of our mechanics and artisans, the multifarious household utensils manufactured from them, and which are subservient either to our pleasures or our necessities. The utility of minerals is not less extensive: thus the salts season our food, and the sulphureous qualities of other bodies render them combustible.

Even earthquakes and volcanoes, though attended usually with calamities, contribute to the general utility of the earth, as, but for these, the sulphureous vapours and subterraneous fires would ascend in much greater quantities into the atmosphere, and render it unwholesome, many warm baths would cease to exist, and, for aught we know to the contrary, many metals and minerals would no longer be produced. Our ignorance alone prevents us from discovering the utility of an infinite number of objects; and, therefore, in the contemplation of certain phenomena of nature which are occasionally prejudicial to man, we ought always to bear in mind this maxim, that, if the Creator sometimes permits partial evils to occur, it is only that they may contribute to the general good. Let us then consider the works of God, not only in one point of view, but survey them on every side, and explore their whole concatenation if we would convince ourselves of the wisdom with which they are constituted and arranged.

We consider many things as injurious which are of incontestable utility, and others as superfluous, though there would be a chasm in creation if they did not exist. How many objects appear of little value, because we are unacquainted with their real uses! Put a magnet into the hand of a person ignorant of its properties, he will think it scarcely worth looking at; but tell him that to this stone we are indebted for all our modern improvements in navigation and the discovery of a new world, he will then entertain a very different opinion of this production. The same observation is applicable to thousands of objects which we disregard or undervalue, from our ignorance of their properties and utility in the general system of nature.

O Lord! the earth is full of thy blessings. How long have I enjoyed thy mercies and witnessed thy beneficence! Grant that I may consider it as a sacred duty to improve myself in the knowledge of thee, and to love thee more fervently for all the blessings which the earth pours forth for my comfort and enjoyment.

JULY 13.

THE CHANGES OF THE MOON.

OBSERVATION teaches us that the moon has a peculiar motion round the earth from west to east; for, after she has arrived directly between the earth and the sun, she retires from that luminary and recedes eastward, changing her place of rising every day, till at length, in a fortnight, she is exactly at the opposite point of the horizon to the sun when he sets. The moon is then said to be in opposition, rising in the evening at sunset, and setting about the time when the sun begins to rise. In continuing her course round the earth, the moon again removes from the point of opposition, and keeps gradually approaching towards the sun: she now makes her appearance later and later every night, and at last is visible only a little before the sun in the morning. This revolution of the moon round the earth explains the cause of her rising and setting at such different times, and why her phases are so various and yet so regular.

You know that a candle can illumine only half the surface of a globe, and that the other half must necessarily remain in the dark. With the naked eye we perceive that the moon is a sphere, receiving her light from the sun; for, when she is nearly in a direct line between the earth and the sun, her enlightened half is turned towards that luminary, and the dark half towards the earth; consequently she is at such times invisible to us; she rises and sets at the same time with the sun, and in the same point of the horizon. This is what we denominate the new moon.

When the moon, pursuing her course, gradually retires from the sun, and passes back towards the east, her dark side is not entirely turned towards the earth, and we begin to perceive a small portion of her enlightened side, as a narrow stripe in the form of a bow or sickle. This luminous crescent we perceive to the right immediately after sunset, or even before, at the opposite point of the horizon: the two points or horns are directed to the east, and the convex part towards the west. The further the moon recedes from the sun, so much the more does the visible portion of her illumined surface increase: at length, at the end of seven days, when the moon has accomplished one-fourth of her revolution round the earth, we perceive one half of her surface enlightened; the luminous portion is then turned towards the sun, and the dark part reflects no light upon the earth: the luminous part of the moon now covers but half the spherical surface; and, the half of this portion being only a fourth of the whole lunar globe, the moon in this state is said to be in her first quarter.

The further the moon retires from the sun, and the more her course again approaches a right line, the more her light increases, and we see a larger portion of her illuminated disc. In seven days after she has completed her first quarter, she is nearly in opposition to the sun; and in this position her whole illuminated hemisphere is visible to the earth. She then rises in the east at the time the sun sets in the west; and this is called the full moon.

The day after the full moon, the enlightened half is turned a little from us, and we no longer see the whole of it; for the light, gradually leaving the western side, falls upon the other half, which is turned from the earth. The further the moon proceeds on her course the larger becomes her dark portion, till at length she turns one half of her dark side, and, consequently, one half of her luminous side toward the earth. This appearance of the moon is denominated her last quarter.

In the various changes of the moon let us behold the wisdom, glory, and goodness of the Creator. From the wonderful harmony that exists between the revolution of the moon round her axis and her course round the earth, it happens that the moon presents to us the same side which she has shown ever since the creation; for, during so many ages, she has with invariable accuracy completed her revolution in twenty-seven days and eight hours: with the most perfect regularity she has at certain periods enlightened at one time our nights, and at another those of distant regions. With what tender solicitude has the divine wisdom provided for the comfort of mankind, assigning the moon as a companion to the earth, which enlightens our night during almost half the year! Alas! how far below its real value do we estimate this dispensation of the Creator! But let us remember that there are people who more highly appreciate the benefit of moonlight, and cannot live without its influence: they are doubtless more grateful for this gift of Heaven than we are in general.

The continual changes of the moon, both in her appearance and in her course, are a lively emblem of the vicissitudes to which all terrestrial things are incessantly subject: at one moment health, joy, and affluence, with a thousand other advantages, diffuse around us a brilliant prospect; in a few days the scene may be changed, and nothing left us but mournful recollections of departed pleasures. What abundant reason have we to desire to depart from this inconstant world, and to pray for our removal to that blissful region where we shall rejoice so much the more in our felicity because, thenceforward, it will be no longer subject to change.

JULY 14.

MINERAL WATERS.

WHETHER we consider mineral waters with respect to their origin or their utility to man, they cannot but be regarded as valuable gifts of the goodness of God; but this, like many other blessings, we are too apt to pass over with neglect and ingratitude: even those very places where life and health flow for us in copious streams are seldom what, by right, they ought to be, theatres of praise and thanksgiving to the dispenser of all good. Let us, my brethren, be henceforth more grateful for the bounty and lovingkindness of our heavenly Benefactor.

The salt springs from which, in many places, our common salt is prepared, probably owe their origin to the mineral salt which is dissolved in the earth; and not less remarkable are the hot springs which are used as baths. These springs abound in Germany; and so hot is their water that it must be left to cool for twelve or eighteen hours, before it is fit for bathing. We are certain that these hot springs receive their heat from some subterranean cause, but it is a matter of difficulty to investigate how this heat is produced and preserved: the subterranean heat has been ascribed to the electrical fluid, and to a great body of fire in the centre of the earth; but the most natural way of accounting for the origin of these hot springs is, that currents of water pass through subterranean soils, containing sulphur and pyrites, and hence acquire such a high degree of heat. When the water comes in contact with the pyrites, it dissolves the sulphureous and ferruginous particles, which become heated by the fermentation and reaction of their principles, and communicate the same degree of temperature to the water in its passage. It is some apology for this opinion that most of the hot springs we are acquainted with are impregnated with sulphur, and some of them with iron: these materials do, in all likelihood, exist in large beds in the neighbourhood of such hot springs, though the water of those formed in Iceland contains neither sulphur nor iron.

Medicinal waters, and particularly those which are acidulous, are produced by the dissolution and mixture of mineral substances: in general we find them in places containing iron, sulphur, or coal; yet coal is pronounced a vegetable production. These waters in their tastes and effects are widely different, according as they are more or less impregnated with those substances. These springs are bitter when they pass through bitter roots, bitumen, nitre, or copper ore; they are cold when the water is mixed with ammoniac, nitre, alum, or when it issues from the bed of a rock; they are rendered oily by bituminous substances, and sulphureous by sulphur combined with acid.

Admire with me, my dear Reader, the inexhaustible source of the divine mercy, which pours forth upon mankind never failing streams. Doubtless, all those mineral springs are produced for the health of man. For thee, O mortal! the Lord causeth springs to arise. You in particular, my brethren, who experience the healing and invigorating virtues of those waters, let your hearts expand with joy and gratitude to your Heavenly Father: honour him by imitating his example, and let the gifts which he has bestowed upon you be sources of life and consolation to your needy and afflicted fellow creatures.

JULY 15.

CONTINUAL ACTIVITY OF NATURE.

If we are anxious to know why nature is never inactive, we have only to reflect upon the number of advantages which result from her constant activity, particularly in the vegetable kingdom. The latter is, indeed, appropriated to the use both of men and animals; but man derives pleasure as well as utility from the vegetable world, and this would not be the case unless the benevolent Creator of the universe had produced plants in succession; in truth, if vegetables appeared all at the same time, neither of these ends could be accomplished. How could man gather in his hay, or corn, or grapes, &c. if they all ripened at the same season? And how could they be preserved to be of use, since many of them are perishable, and soon lose both their flavour and their virtues? And, then, what a world of pleasure should we lose! How could we enjoy the cooling fruits of summer, surrounded by the frosts and snows of winter?—Would not our wines become vinegar if the grapes were ripened in the heats of summer? And what would become of a number of animals in the preservation of which Providence is so deeply interested? How could they live, if all the productions of the earth arrived at maturity at the same time? There are one hundred kinds of insects which feed wholly upon flowers. How would they subsist if the flowers lasted but two months? It is true that the greater number of insects find no food in the winter; but they are so constructed that during that time they are in a torpid state: this could not be the case during summer, because the warmth would rouse them. If, therefore, nature were differently disposed, man as well as animals would suffer from it, and perhaps perish with hunger. Thus it appears that the present activity of nature in the vegetable world is best calculated for the support of so many creatures of every description.

If we now reflect upon the pleasures of the eye and ear which the Almighty has bestowed upon mankind, we shall find that any other arrangement would greatly deprive us of them. It was not sufficient that flowers should display their beauty for a short season, but that man should enjoy them in succession: in the spring, when we wander in the country, we behold the trees covered with blossoms; the summer displays fresh beauties; and when autumn unfolds its golden stores, the poppy, the harebell, and many other flowers enliven the lovely landscape. Thus do they appear in succession, and replace each other during those seasons in which man can partake of the pleasures arising from their beauty. When winter comes and the cold confines us to our apartments, nature produces other vegetables, which are not striking to the eye, but which, nevertheless, possess many useful qualifications. The pleasure and satisfaction of man seem, then, to be the end which God has proposed in arranging nature as it now appears.

Such, generally speaking, is the plan upon which the Almighty has constructed the vegetable kingdom: every thing is so arranged that every living creature can find sufficient subsistence, and that mankind in particular shall at the same time be furnished with ample sources of pleasure and enjoyment: every plant has its stated period for its blossoms and fruits, and that period is so contrived as to be most useful. Scarcely has the one performed its office when another appears in all its beauty: we see many thousands of plants all following the same fixed law.

Every thing created by the Almighty is conducted with this same invariable and wise order, although the weakness of our understandings renders us incapable of judging of their utility. Let us then bless our benevolent Creator and give him glory, acknowledging his mercy and love in all the revolutions of the vegetable kingdom, of which our happiness is the end. With what delight and joy should we not contemplate the beauty of nature in our gardens and in our meadows!

JULY 16.

BEAUTY AND UTILITY OF MEADOWS.

At this time of the year the aspect of a beautiful and extensive garden inspires us with the most lively sensations of pleasure, a pleasure of which we can form no idea while we remain immured in our apartments; but the fields and meadows impart a delight far beyond that produced by the inspection of the most lovely flower garden: the gaudy tulip, the elegant narcissus, the beautiful hyacinth charm not so much as the wild flowers which enamel the green sod beneath our feet.

Beauty alone is found in the former; the latter display both beauty and utility: and beauty, divested of utility, may please for a moment, but no longer. Is it not true, my dear Readers, that the long gravel walks, the bowers, the thickets and gay parterres, the enclosures which surround us in a garden appear to confine us, to set bounds to our liberty? We long for the freedom of the open country: there we appear more independent, more at our ease. In the fine days of summer beautiful and fruitful nature varies her aspect every instant: in our gardens, on the contrary, we always see the same objects; their order, proportions, and regularity tire from their uniformity. The eye wanders with delight over a wide extended country; and nature, ever provident, has so arranged the face of our globe that the greater part of it is composed of plains and valleys or gently swelling hills. Rocks and mountains diversify the scene, lifting their towering heads above the clouds. Man has not the trouble of watering or sowing the seeds from which spring the numerous grasses and luxuriant herbage which beautify the prospect.

But this prodigious diversity of plants which is spread over the plains is not confined to our amusement: they have each a leaf, a flower, and a particular virtue. It is true that the same plant may abound luxuriantly in the same field, but we cannot set our foot to the ground without treading upon a great number of different kinds. Many of the flowers cultivated in our gardens have been transplanted from our meadows, besides which they produce an infinite number of simples of the greatest utility in pharmacy: but the chief good arising from meadows is the subsistence they provide at a little expense for those animals which are most useful to man: the labouring ox, which provides us with food, requires only the product of the meadows for his support; the horse, whose services are innumerable, demands, as a reward for his labour, the range of the meadows, a little hay, or a few oats; the cow, which furnishes us with milk, butter, &c. demands no more.

But is it not lamentable that man should be so generally insensible, so inattentive to the benefits bestowed by God? He looks upon grass with contempt or indifference, possibly because he thinks the meadows are of no immediate use to him, or perhaps because it grows under his feet, and that the Almighty has not made it an object of his care and of his culture; but, from whatever cause his indifference may proceed, it is perfectly inexcusable.

Would to Heaven that we could never behold the verdant and enameled meads without being deeply sensible of the goodness of the Most High, whose beneficent hand is ever open, shedding abundance upon all his creatures! There is no spot of earth under heaven which does not proclaim his loving mercy: the sandy desert, the marshy fen, the stony rock, &c. all are alike beneficial either directly or indirectly to mankind. The whole earth may be considered as a vast meadow, in which every living creature may find means of subsistence.

How beautiful are these smiling plains! How lovely the flowers which adorn them! Adam himself, even in Paradise, saw none which could surpass them. The feathered songsters celebrate the praises of the Creator of the world, while the woods and groves and forests and rocks and mountains silently yet eloquently proclaim the glory of the Most High.

JULY 17.

MORNING TWILIGHT.

THERE is no doubt that twilight claims utility as the principal cause of its existence. Twilight is neither more nor less than the prolongation of the daylight, which in one instance gradually prepares us for the approach of night, and in the other for the increasing brilliancy of the day. But twilights are not always the same: they vary according to the seasons and to the climates. Towards the poles twilight is of longer duration than at the torrid zone: the inhabitants of the latter behold the sun rise perpendicularly above the horizon, and at night plunge itself as directly beneath it, to enlighten the other hemisphere; so that the darkness of night comes suddenly upon them. Towards the poles, on the contrary, his rays fall obliquely; and, as he sinks but a short distance below their horizon, their nights, though long, are almost always accompanied by twilight. It is a blessing to the people of the torrid zone to have no twilight; and it may be considered one of the greatest importance to the inhabitants of the poles that they enjoy a twilight of so long a duration.

As for the inhabitants midway between these two extremes, their twilight decreases as the days diminish, and increases as they increase: they sometimes enjoy an hour's light after sunset, and the same before the sun rises. For this beneficial arrangement we are indebted to the properties bestowed by the Almighty upon the atmospheric air: when the rays of light traverse the atmosphere in a perpendicular direction, they reach us uninterruptedly in a straight line; but when a ray enters the atmosphere obliquely it is bent backwards and falls towards the earth, instead of keeping its original direction: thus, when the sun approaches our horizon, its rays, impeded by the atmosphere, are inclined towards the earth, and reach us more faintly than if they fell directly upon us; and, by this curious effect, we enjoy the advantages of twilight after the sun has set and before it rises. This law of the refraction of light is of inestimable advantage to the inhabitants of the polar regions in particular: without twilight they would at times be plunged in the most profound and absolute darkness.

Some of my readers may find it difficult to comprehend this explanation of twilight; but let us leave to philosophers the task of divining the causes of this phenomenon, while we return thanks to the Almighty for its beneficial effects—effects which are sensibly felt by persons of every description, and by none more than the poor labourer, who frequently, by the soft light of twilight, beats out the gleanings of his children, cultivates his own little garden, and fulfils other duties of importance to his family, which he has no time during the day to perform. To the traveller how cheering is the mild glow of twilight. Ah! how insensible are we to many of those blessings which surround us! O thou sun—thou most beneficent of all God's creatures! what would be the world deprived of thy cheering rays? How dull would be the peasant's labour, the traveller's journey, unless cheered by the phenomena produced by the atmospheric air! The earth would be a desert. Ah! I will bless God for my own existence, for the existence of such a world as this, and the hopes and expectations of a better.

JULY 18.

THE PLEASURES OF THE COUNTRY.

COME, let us partake of those pleasures which are only truly valued by the wise. The genial rays of the sun invite us to the fields: there we may indulge in the purest sensations: there, in the flowery meadows, we can freely and duly chant the praises of the Most High!

How gently do the zephyrs waft to and fro each tender twig, each trembling leaf! Every thing before us appears animated either by graceful motion or by songs of joy.

Ye shady woods and verdant plains—ye lofty mountains, clad in nature's richest robes, loudly do ye proclaim your Maker's praise. Your attractions are derived from nature, and the beauties of the garden fade before you.

Soon will the golden harvests repay the labourer for his toils: soon will the vines and orchards pour forth their stores. The birds rejoice around us, and, by their songs of joy, declare the fulness of their bliss.

Every year renews the treasures of the husbandman, whose serene countenance glows with peace and contentment. Pride, envy, and the vices of the town are strangers to his bosom: his days are passed in peace, and his nights in undisturbed repose.

Nothing can interrupt the happiness of the sage who delights in the contemplation of nature, who employs his reasoning powers in meditating upon her numerous works. To him the rich pastures, the dewy meads are but the medium through which he beholds the wisdom and power and glory of the sublime Author of the universe.

EVENING TWILIGHT.

TWILIGHT is that feeble light which appears in the west after the sun is set. It is occasioned partly by the refraction of the sun's rays, partly by their reflection, and partly by the proper atmosphere of the sun, known by the name of "zodiacal light," which is seen in spring towards the evening, and towards the morning in autumn.

When the sky is serene the smallest stars are discernible during the twilight: it commences from the moment the sun disappears until night is set in, and lasts about two hours. In the island of Senegal, where the nights are generally as long as the days, twilight lasts but a few minutes; the interval between sunset and the darkness of the night is not more than a quarter of an hour: thus, when the sun has sunk ten or fifteen degrees below the horizon, the darkness of midnight extends over the whole country.

About the first of March and the eleventh of October the twilights are the shortest with us. When the boreal declination of the sun and the descent of the equator below the horizon is such that the sun sinks not more than eighteen degrees below the horizon, then the twilight lasts throughout the night; and hence it is that, at the summer solstice, we have no dark night.

The advantage which we and the inhabitants of several other countries derive from twilight are very sensible. To pass immediately from daylight to total darkness would be attended with much inconvenience; and a sudden transition from dark night to brilliant day would injure our sight: travellers overtaken by so sudden a night would lose themselves, and the feathered tribes would be in danger of perishing. The wise Author of nature has foreseen all these dangers, and has averted them by giving us twilight, by means of which we pass gradually from light to darkness.

JULY 19.

THE MAYFLY.

THIS insect, the prettiest of the fly tribe, is called ephemeral, from the shortness of its existence in the form of a fly. It undergoes five changes: it first receives the principle of life as an egg, from whence issues a caterpillar, which is subsequently transformed into a chrysalis; it then becomes a nymph, and finally a fly. The fly deposits its eggs on the water, where the sun hatches them: a little red worm then issues from them, which moves in a serpentine direction. These are found in abundance on the surface of ponds and marshes during the summer; but, so soon as the water becomes cold, the worm makes a kind of shell, in which it dwells during the winter. Towards the conclusion of the inclement season it ceases to be a worm, assuming the form of a chrysalide, in which it sleeps till spring, when it becomes a pretty nymph, somewhat resembling a minute fish: upon the day of its last metamorphose the insect appears numbed and inactive: at the conclusion of about six hours the head of the fly rises by degrees above the surface of the water; the body slowly follows, until the whole insect, under the form of a fly, is freed from its state of bondage: wearied with its exertions, it falls upon the water and remains in an inactive state for a short time, after which it gently agitates its wings, and, finally, rising from its watery bed, skims lightly through the air. During the six hours of their existence, these flies wanton and sport together in immense numbers, after which they lay their eggs and die: they never survive the day which gives them birth as flies.

The history of the lives of these little insects should teach us how erroneous our judgments are upon the duration of our lives, when compared with eternity. Let us suppose that one of these flies had enjoyed the extended period of twelve hours of existence, and that, consequently, he would be considered as one of the ancients of his race. Let us farther suppose him gifted with the faculties of speech, and addressing his friends in the following words:—

"I am now convinced that the longest life must have a termination: the conclusion of mine is arrived, and I do not regret it; for the infirmities of old age oppress me, besides which I no longer see any thing new beneath the sun. All that I have seen convinces me that every thing is uncertain and inconstant: a whole generation of ephemera has been swept away by a whirlwind; the coldness of the air has destroyed thousands of our most promising youth. I have lived in the first ages of the world: I have conversed with insects far beyond those of the present degenerate race in mental and bodily powers. This sun, too, which now is fast sinking beneath the earth, I have seen him shining in transcendent brilliancy in the highest heavens. My experience is great; for my life began when the sun first dawned upon this nether world, and I have survived millions of my race. To number the periods of time during which he has shed light and heat throughout the world would be impossible; but now his glory fades, and I foresee the dissolution of all things is at hand. Alas! my friends, I thought my life eternal. What beautiful cells had I constructed for my dwellings! How great were the hopes I founded upon my good constitution, my strength, my agility, the power of my wings! But I have lived long enough: few of my superiors will leave behind them the memory of a longer or more brilliant career."

Thus might speak an insect which had lived nearly twelve hours upon the earth; but the man who had attained the age of threescore and ten, might he not hold the same language? Truly, the difference between twelve hours and seventy or eighty years is as nothing, when compared with eternity; and seldom do we employ our time to more advantage than the poor mayfly his twelve hours of existence.

JULY 20.

NOTHING PERISHES IN NATURE.

If there were any thing in the world which absolutely perished without any beneficial result, we might doubt the wisdom of God's government; but we may firmly believe that, in the immense circle of creation, nothing is lost; not even a grain of sand.

The seed which falls from a blossom is not destroyed: it is either wafted by the wind to fecundate its own species, or it drops in the ground; and from it springs a tree, a shrub, or flower. Some seeds are eaten by birds and animals, and undergo a preparation which renders them excellent as manure for our fields. One thing may apparently perish, but its substance is but converted into another, in order to accomplish certain ends, which it was incapable of effecting in its original form: the butterfly could never have produced its fellow had it not been first a worm.

Innumerable will be the instances which will appear, to our limited understandings, as convincing proofs that many things are wholly useless, and perish without the result of good; but let us not precipitate our judgment upon this subject, nor presume to question the power of the Most High. Rather let us conclude that all we see, however strange and unconnected it may appear, is so arranged as best to fulfil the ends destined by supernal wisdom. Let us look around us: every thing is connected; every thing is in its place. Every thing has its use, even though it turns into dust: not the smallest leaf—the most minute insect, which, whirled by the summer blast, is swept away—not a particle of sand—no, not those creatures which escape our vision—nothing absolutely perishes. The starry firmament, the bright orb of day, the motes which play in its beams, and which we inhale without being sensible of their existence, all alike appeared at the command of the Almighty Creator of extensive nature; and all HIS works are perfect: yet man, presumptuous man dares to question their propriety, their utility, their durability!

Oh! let me not resemble these infatuated mortals, who believe only what they can comprehend; but let me glorify God, and make sure my happiness by the firm belief that he has created nothing in vain. My body itself shall not be annihilated, though it will gradually decay, and finally be consigned to the tomb: there it will turn to its original dust; but the particles will remain, and, at the command of him who first called them into being, my body will resume its original form, and in that form it will receive, with the myriads of past and future ages, its final doom. Oh! may we be prepared to meet that doom as becomes Christians who have been cheered on their weary pilgrimage by the hope of a blessed immortality!

JULY 21.

DIVERSITY OF THE CLIMATES OF THE EARTH.

The Creator having given to our earth a spherical form and a double motion, it naturally resulted from these circumstances that the different parts of the earth should experience a variety in the temperature of the air and the change of seasons, as well as in animals and plants. In certain countries of our globe there is but one season, that is to say, summer reigns throughout the year; and it is there as hot during the whole year as it is with us in the midst of summer.

These countries are situated in the middle of our globe, and the space they occupy is called the torrid zone. The most delicious fruits which nature produces grow in these countries; and the most precious of this world's goods are found beneath their burning soils. The days and nights are there always of an equal length.

There are other countries so cold during the greater part of the year that our most rigorous winters would be considered mild by their inhabitants. It is only during some few weeks of the year that the weather is temperate enough to allow the scanty vegetables of these inhospitable climes to attain their growth and verdure; and here the inequality of the days and nights is greatest, daylight lasting sometimes for weeks together.

The temperate zones, situated between the torrid and the two frozen zones, occupy the largest portion of our globe. In these climates there are four distinct seasons—spring, when the days and nights are nearly equal; summer, that delightful season when the days greatly exceed the nights in duration; autumn, when we reap the fruits which spring had put forth in blossoms and summer suns have ripened: winter closes the scene, with its shortened days, its leafless trees, and chilly blasts.

When it is winter in one temperate zone it is summer in the other. There appears the greatest variety in the productions of these zones: the vine flourishes most abundantly in them; for the heat of the torrid and the cold of the frigid zones prevents its culture in those parts. Man in particular, in the temperate zones, appears to enjoy a superiority over his fellow creatures inhabiting the burning climes of the torrid or the frozen ones of the polar regions: the latter are short and squat in stature, and deficient in intellectual gifts: those who live in the torrid zone are weaker in body, are inflamed with violent passions, and possess but little mental excellence.

Yet, notwithstanding this difference, Providence has equally dispensed its gifts, as far as relates to the happiness of his creatures: each country produces that which is most suitable to the comfort and convenience of its inhabitants: a worm which feeds upon the mulberry tree spins them silk, with which they weave a light clothing; and a tree produces a bud containing a soft substance, of which they also construct a pleasant wearing apparel. The colder climates, on the contrary, abound in beasts, whose skins and furs compose a soft and warm clothing for the chilly inhabitants; and their forests procure for them an abundant supply of fuel. The torrid zone is rich in cooling luscious fruits, to mitigate the temperature of man's body; and these abound so luxuriantly that they can supply less genial climes with their superabundance. Again, in the northern climes this deficiency is supplied by innumerable kinds of fish and animals, which furnish food to the inhabitants; so that, upon examination, every zone of our globe exhibits proofs of the majesty and bounty of the Almighty. There is no country so wholly destitute of the necessaries, nay, more, the pleasures of life as to conclude they are overlooked by their great Creator. Everywhere we may discover traces of thy bounty, O thou benevolent Father of men! The burning deserts of Africa, the lofty barren mountains of America proclaim thy government and liberal love: all nations and tongues declare thy glory, O thou Father of Beings!

JULY 22.

PECULIAR PROPERTIES OF THE SEA.

We are apt, in looking at the sea, to consider only the dangers attending it, without at all reflecting upon the wonders and benefits which it confers upon us. It cannot be denied that, when agitated by tempestuous winds, when its waves rage and foam, it presents a most appalling spectacle: its effects are then terrible: vessels are driven upon its stormy bosom far beyond their destined journey, sometimes upon rocks and shoals of sand, where, unable to resist the violence of the waves, they are broken to pieces, and the poor mariners are plunged into the bosom of the deep. In addition to these dangers may be added those arising from whirlpools and waterspouts. These latter rise from the sea generally in the form of an inverted cone; they are frequently whirled round by the wind, and, if they approach near to a vessel, they are exceedingly dangerous; they have been known to lift a small vessel from the sea, then let it fall with such violence as to sink it or split it to pieces. If the mischief does not extend so far, they frequently destroy all the rigging and disable the vessel exceedingly.

But we should be very ungrateful to look only to the injuries arising from the sea, without reflecting upon the magnificent works of God, which are so powerfully displayed in the depths of the ocean.

The most distinguishing property of the sea is its saltness: one pound of sea water will produce two ounces of salt. Sea salt is lighter than rock salt; yet it will not evaporate in the air, neither is it diminished by a frequent mixture with fresh water. The cause of this saltness has never been discovered; it has been imagined that there may be mountains of salt at the bottom of the ocean, yet one would then suppose that it would be salter in one place than in another, a circumstance of which we have no proof; but, although the cause still remains a mystery, its good effects are easily discerned: the saltness of the sea preserves it from corruption, and gives it that strength which enables it to bear such immense burthens as float upon its bosom. The colour of the sea claims also our attention: it is not the same in every place. I do not allude by this to the tints it borrows from a clouded sky, the foam of storms, or the reflection of those various hues observed at evening sunset; nor those arising from the decayed substances of marine plants or fishes. When it is calm it will appear sometimes studded with brilliant stars; and the track of a vessel frequently seems marked with fire: these phenomena may be attributed partly, on the one hand, to sulphureous, oily, and inflammable substances, and, on the other, to luminous insects.

Another beneficial property possessed by the sea is the ebb and flow of the tide. In the course of twenty-five hours the sea advances and recedes twice; but the peculiarities and benefits of the tides I have already mentioned.

Even allowing that these wonderful properties should be insufficient to excite our attention, yet the creatures which inhabit it cannot fail to claim our warmest admiration. Aquatic animals are not, it is true, so varied as the beasts which inhabit the earth; but their figure and size are more extraordinary, as well as their longevity: the ostrich and the elephant are small when compared to the whale, whose length is sometimes sixty or seventy feet. And who is there can enumerate the various kinds of animals which inhabit the mighty deep?—Who is there can explain their nature and properties? How great are the powers of the Almighty!

And we may rest assured that the unequal division of the land and sea was dictated by the wisest reasons: the seas were not only intended as the grand reservoirs of water, but also as the sources from whence we were to derive snow, hail, rain, and vapours. Perhaps the most remarkable circumstance relating to the sea remains still to be mentioned: the bottom of the ocean is as much diversified by rocks and mountains, hills and plains, caves and springs, and plants and animals, as the surface of the earth; islands are, in fact, but the summits of some lofty marine mountain. And what wonders remain yet undiscovered, since it is impossible for the eye of man to penetrate the secrets of the deep!

Admire and adore then, O Christian! that majestic Being who has imprinted the marks of his power and wisdom upon all his works, in the ocean as well as in dry land.

JULY 23.

THE VARIETY OF TINTS WE MAY OBSERVE IN FLOWERS.

WITH a heart overflowing with love and gratitude, I wander in the midst of nature's fairest sweets. How beautiful are the colours they display! How lovely the blending of their various hues! These are touched delicately by the hand of taste; while those display more brilliant and varied colours, yet all so tempered, so harmonized that we gaze with astonishment upon the happy union of so many opposite, or, as we should say, discordant colours. The tint of the groundwork of the flowers is always so chosen as to set off the more ornamental parts, while the green leaves which surround it greatly increase its effect. In this arrangement the Almighty appears to have had no other end than our amusement! How stupendous are God's works! In wisdom has he made them all. I can but admire the magnificent ends the Almighty has in all his designs proposed, and the means employed to execute them. It is with difficulty man brings one work to perfection, and that with much labour and pains; but a single instant is sufficient to the Supreme Disposer of the universe to bring forth millions of beings in a state of perfection. Six thousand years have nearly elapsed since this world was created; and during that time man has found ample subjects of admiration, but not one exhibiting a single defect: the more closely we examine the works of God, the more does their beauty delight and their novelty enchant us.

That which is the most pleasing in the tints of flowers is their simplicity. One would suppose that our Creator had employed an infinity of materials thus to embellish nature, and to distribute to the flowers and plants so many rich and brilliant colours; but God has no need of extraordinary exertions to render this world a theatre of wonders. One element takes under his hand the most beautiful forms and colours:

the humidity of the earth and air insinuates itself into the tubes of plants, and from this simple process arise all the wonders of the vegetable kingdom. This is the only cause from whence are derived the beauty, the life, and the perfume of flowers. If every colour had its particular cause we should cease to be astonished at their variety; but now we are lost in amazement at the simplicity of such a varied performance arising from one and the same source.

At this moment that I am examining the variety in the tints of flowers, I feel most sensibly the value of my rational powers. Without reason I should be deprived of the pleasure I now enjoy, and the whole vegetable world would blossom in vain for me; the beauty of the forests, the meadows, the hills and the valleys would no longer delight my eyes, nor raise my heart from nature's works to nature's God. O thou Almighty Father, thou all powerful Creator! how can we sufficiently testify our gratitude for all thy bounty to us? It is but just that, in contemplating thy works, we should bless thee above all for that faculty which enables us to judge of their beauty and the bounty of their Creator.

JULY 24.

THE INTENSE HEATS OF SUMMER.

THIS is generally the hottest time of the year; and yet it is true that the sun, which is now in the sign Leo, is gradually and daily receding from us: when we were nearer this glorious orb the heat was more moderate, and now that we are at a greater distance the heat is intense. Does this phenomenon accord with the laws of nature? Most certainly; and now let us consider the cause of it. Although the sun was, in fact, nearer to us in the winter, his rays then fell obliquely upon the earth, and did not, therefore, penetrate deeply into its surface: now that he has reached the highest point of the heavens the earth receives his rays strongly and powerfully; besides which, the ground has been gradually warmed, so that even a smaller portion of heat would more affect it than when the sun's beams fell upon a cold and frosted soil.

This arrangement of nature is displeasing to many persons: they complain of the oppressive heat, which prevents them from pursuing their labours unremittingly. But is it not childish and unreasonable to murmur at the immutable laws of nature? And is it not likewise ungrateful to our Heavenly Father to complain of his government, which always tends to the good of all his creatures? What, would we relinquish those delicious fruits and vegetables which, during the ensuing winter, will furnish food to many persons, because we suffer a trifling inconvenience from the heat? This would, I repeat it, be the height of ingratitude towards that benevolent Being who counterbalances every seeming evil by some essential good. The inhabitants of the western parts of Africa, particularly those at Cape Verd and the island of Goree, are exposed during the whole course of the year to the most scorching heat; but their constitutions resist all the effects of this burning clime, and the wind, which always blows briskly there, tempers and refreshes the air.

And has the Creator manifested less kindness towards us? How unpardonable should we be if we continued insensible to the marks of his love! Even when fainting under the heat of his brilliant sun, do we not hail the approach of the evening breeze with delight? and is not the freshness of the night most grateful and reviving to our languid frames? The effects of the cool night air is sensibly experienced by plants and animals; and so powerfully does man rejoice in its genial influence that the fatigues and labours of the day are forgotten. Storms and tempests, with all their attendant terrors, are nevertheless the beneficial instruments of the Almighty's will; and, if the heats oppress us, the sun which scorches us ripens, at the same time, those fruits so cooling and so refreshing in their nature.

Cease then, O Christian! to complain of the heats of summer, as well as of those grievances which afflict and torment you. Both the one and the other equally accord with the plans of divine wisdom; both are mitigated by innumerable antidotes, and should therefore excite in us a perfect submission to the decrees of the Sovereign Master of the universe, to whom be glory and power and honour and immortality!

JULY 25.

THE WONDERFUL INSTINCTS AND PROPERTIES OF ANIMALS.

Of all the kingdoms of nature the animal is the most remarkable; and there cannot be a more interesting study for the lover of natural history than the properties and instincts with which animals are endowed: but to a reflecting being this subject offers more than amusement, and the contemplation of their particular properties leads him to reflect upon the depths of that Almighty wisdom at whose command they sprung into existence: this should be the end of all our inquiries.

The manner in which birds produce their eggs is truly wonderful, and worthy of admiration. The grasshopper, the lizard, the tortoise, and the crocodile are among the number who pay no sort of attention either to their eggs or their little ones; they lay their eggs in the ground, and leave them to be hatched by the sun: others, by an instinct truly wonderful, deposit their eggs where the little ones, when first hatched, find a plentiful supply of food; the parent insect is never deceived in this affair: the butterfly produced from the caterpillar, which feeds upon the cabbage, will never deposit its eggs upon meat. Some insects have so much affection for their little ones that they carry them wherever they go: the spider, for instance, called the wanderer, carries her eggs in a little silken bag; when the young ones are hatched, they arrange themselves in a regular order upon the back of their mother, who for a certain period wanders about with this burthen, until the little spiders can provide for themselves.

There is not a plant, a leaf, but what serves as food and dwelling to some kind of insect. One fly pierces the leaf of the oak, and then drops its egg into it; the wounded leaf swells and closes over the egg, and an excrescence is formed called a gall; the egg, in the meanwhile, is thus protected from all the attacks of the weather, and when the insect is fully formed it eats its way out, and at the moment of its birth, if we may use the expression, finds itself provided with house and food.

The proofs of the love and care of animals towards their young are almost incredible; and it is impossible to read the following account of the power of maternal love without being deeply affected:—A poor bitch, while undergoing the torture of dissection, appeared to feel some alleviation of her sufferings in licking her cubs; and when they were taken from her, she then uttered, and not till then, a piercing cry.

Every animal has its particular wants and peculiarities, and their benevolent Creator has provided for both. Let us consider, as an example, those birds which find their support partly in the water: in the first place, nature has provided them with an oily gummy substance, which prevents the wet from penetrating through their feathers; the proportions of their bodies are also different from those of other birds; their legs are placed farther backwards, to enable them to stand in the water and spread their wings over them; and, to assist them in swimming, they are furnished with webbed feet; their beak is generally large, and their neck long.

The nautilus somewhat resembles the snail shell in form: when this curious little fish wishes to rise to the surface of the sea, it extends its body, forcing the water out of the shell; by this action the shell consequently becomes light, and gradually ascends; the fish then extends a thin membrane, which acts as a sail, while it puts out its tentacula as oars; with these it rows and guides its little vessel across the bosom of the glassy deep; for it is never seen but in calm weather. In order to descend, it draws in its oars, takes down its sail, and, the water entering the small aperture by which the animal withdraws, the shell gradually sinks to the bottom of the sea.

The actions of animals are not less remarkable than their structure; the same wisdom which has formed their bodies has also regulated their various instincts and their consequent results, all tending to one destined end. Animals are, indeed, unconscious instruments in the hands of the Creator, performing certain movements agreeably to his will, ignorant of the secret springs which actuate them, yet appearing to be aware of their effects; they, like the planets, have each their sphere, which they cannot quit.

When, therefore, I contemplate the divers instincts of animals, I contemplate a superb spectacle, the chief actor and main spring of which is seen but through a curtain darkly; for, while this mortal coil is on us, we could not bear the splendour and dazzling brightness of that great Being before whom the angels bow their veiled heads, unable to look upon the infinite and the Almighty.

JULY 26.

THE HUMAN COUNTENANCE.

THE external form of man announces his superiority over all other animals: his countenance, bearing the stamp of majesty and sovereign rule, declares it, and his erect posture further confirms it. What, then, must be the dignity of his future destiny?

While the soul is tranquil, the countenance of man is calm and composed; but when agitated by passions, it is the mirror in which they are reflected with unerring precision. Every emotion of the soul has its peculiar characteristics, and these are faithfully portrayed in the countenance. The eye has been aptly termed the window of the soul: it is the glass through which the most violent passions, the tenderest affections can be discerned: the colour of the eyes and their movement contribute greatly to the character of the face. The eyes of man are so placed that he can behold the same object with both eyes: with other animals, generally speaking, the case is different, unless the object be at a very great distance.

Next to the eyes the eyebrows may be considered as the most expressive feature of the face: they have two kinds of movement, which are effected by the muscles of the forehead; these depress, contract, or elevate them. The eyelashes constitute no small ornament of the human countenance: men and monkeys alone have lashes both to the upper and under lid; all other animals have them only upon the under lid.

The eyelids protect the eye from danger: the upper one can be raised or closed at pleasure; the lower one has but little movement: but when sleep weighs heavily on them we cannot resist its powerful effects, and they mechanically close.

The forehead, when finely proportioned, constitutes a great beauty in the human face: the nose is the most prominent part of the face; but, as it is only in violent emotions that it has any action, it contributes more to the beauty than to the expression of the countenance. Next to the eyes the mouth possesses the most expression, and it is farther animated by the action of speech: the red tint of the lips, contrasted with the whiteness of the teeth, adds greatly to human beauty.

We have at present only considered the human face as to the beauty of its parts, without considering their utility and the ends which they are destined to fulfil; but under this single head we can discover the infinite wisdom and goodness of the Almighty, who has so wonderfully united beauty and utility in all his works. When we contemplate the beauty of our fellow creatures, we should sanctify our admiration by directing our thoughts to Him from whom it is derived; it would also be but just to meditate in silence upon the prerogatives which the Creator, in forming our features, has given us over all other creatures, and to reflect upon the glorious destiny reserved for those who so use the good things of this world as not to lose those which are eternal. Even in this imperfect stage of our existence our eyes may be raised in adoration, our lips may open with songs of praise to the Most High.

The ravages of time and sickness, the chill stillness of death—these should check our vanity and pride when we contemplate a lovely animated countenance: these should teach us that man was made for another and a better world—that his body, beautiful as it is, will, after the resurrection, be clothed in more exceeding glory, fit only for those blessed abodes where all is beauty, peace, loveliness, and eternal bliss.

JULY 27.

THE ATTRACTION OF BODIES.

GOD hath endowed all bodies with a power which is in constant force at all times and in all places. If one body endeavours to move towards another, we say it gravitates to that object; for experience teaches us that all bodies have a tendency to fall towards the ground when elevated from it, unless they are suspended. We must not seek for the cause of this effect in the falling body, because it remains stationary after it has fallen, unless put in action by some other cause: neither can it be in the air; for that, being in itself a heavy substance, would rather impede than accelerate the fall: perhaps the most plausible solution of this curious effect may be found in the attraction the earth is supposed to possess over all objects within a certain distance, just as the loadstone attracts iron.

But, if we cannot satisfactorily determine the cause of this phenomenon, its advantages are most evident: without attraction or gravitation we could not move as we now do. The centre of our gravity is about the middle of the human body: if we lift the right foot, the left must support the centre of gravity: if we then bend the body forward, we are in danger of falling; but, by advancing the right foot, we prevent the fall and advance a step. The centre of gravity, while we walk, is preserved precisely between the two feet: hence it is that we bend the body forward when we ascend a hill, and backwards when we descend: we also lean forwards when we carry a burthen on our shoulders, and backwards when we carry it before us. All this arises from the law of gravitation, by which the movements of every animal are governed, whether it walks or swims or flies.

This law likewise governs the motions of those prodigious bodies which roll through the firmament: the sun attracts the planets; the planets their satellites. The planets and the moon pursue their course with incredible swiftness; and it should seem that the swiftness of the former might precipitate it far beyond our sphere, if there were not a counter power to impel it towards the earth with equal force; and this force is the gravitation of the moon towards the earth.

If our earth were heavier or lighter than it is, what would be the result? It would either approach so near the sun that we could not endure the heat, or it would be precipitated so far beyond the sun's rays that we should perish with the cold.

In this wonderful arrangement of the gravitation of bodies I see fresh cause for wonder and admiration. By this law of nature the movements of animals and the heavenly bodies are alike regulated: every grain of sand, every drop of water is by this law preserved. But it is in this that Almighty wisdom is most conspicuous, that by the most simple decrees it effects the most stupendous works. How different are all human operations! What labour, what toil, what difficulty to surmount, before they can be carried into effect! In the gravitation of bodies I find fresh cause of admiration and increased excitement to praise and adoration. I bless thee, O my God! for all thy mercies, for all thy decrees, and for all thy fatherly goodness and provident love.

JULY 28.

MANY DIFFERENT EFFECTS OF NATURE ARISE FROM THE SAME CAUSE.

NATURE presents itself as an uninterrupted chain of causes and effects; and, as every part of the universe is connected with some other, every motion, every event depends upon a preceding cause, and will in its turn become the cause of succeeding effects. The government and constitution of the world are calculated to convince us that it is not to chance, but to a divine wisdom that the wonderful structure of the universe owes its origin. This knowledge is not difficult to attain; for, however limited our understandings may be, we cannot fail to discover a multiplicity of effects, which are derived from causes evident and comprehensible to man's understanding.

A number of natural phenomena may furnish us with examples. How varied are the effects produced by the sun! Animals and plants, the fluidity of water, the exhalation of vapours, the formation of clouds, rain, and benevolent dews, these all derive their source, their formation from the genial rays of the sun.

The air produces an equal variety of effects: by its assistance every vital function in the animal world is performed; it kindles fire, it fans it, and by this effect the air itself acquires an elasticity which, as it extends, produces waves of air; and, by the vibration arising from their succession, sound is conveyed to the ear: air assists birds in their flight, and enables man to traverse the most extensive seas: twilight is derived from the motion of the air, and without it we could neither speak nor hear. All these things depend upon the air we breathe: this wonderful element, which surrounds our globe, is so subtle that it eludes our sight; yet is it so powerful that no other created thing can resist its power when exerted to the utmost.

Gravitation fixes the mountains and gives to water its fluidity; it confines the ocean to its depths and the earth in the orbit prescribed to it; in short, it maintains every thing in nature in its proper sphere.

And who can point out the divers advantages and qualities of water? It dilates, softens, and mixes a great number of bodies, of which, without its assistance, we could make no use; it is the most wholesome beverage; it is the best nourishment for plants; it furnishes us with an abundance of fish, and procures for us the treasures of distant countries.

How various are the uses of fire! By it solid bodies become fluids, and are again reduced to solids; it boils fluids, or reduces them to vapour; it constitutes the reviving and extensive principle of life diffused through the vegetable and animal kingdoms.

But it is not only in the natural world that we find the same cause producing different effects; oftentimes in the moral world one single inclination of the soul produces most opposite effects. Let us take for example the principle of social love: from this affection are derived the love of parents to children and that of children to parents, the ties of friendship and of patriotism, the benevolence of those who govern and the obedience of those who serve: thus one single feeling retains every individual in his proper circle, forms the grand chain of human society, becomes the principle of virtuous actions, of laudable undertakings, and of all our innocent recreations.

These reflections evidently prove that the materials which compose the world were not jumbled promiscuously together, without relation or connexion, but that, on the contrary, it forms a perfect whole, arranged by wisdom itself: every phenomenon of the visible world displays the omniscience and omnipotence of the divine Creator. And how many wonders escape the penetration and researches of the most persevering and inquisitive minds! Let us not, however, be discouraged, my dear Readers, but meditate constantly on the works of God, and convert our knowledge to his glory. Then our hearts will be deeply impressed with the truth of those words of the Royal Psalmist—"The works of the Almighty are great, sought out of all them that have pleasure therein."

JULY 29.

THE DISEASES OF SOME PLANTS.

VEGETABLES are subject to many diseases: sometimes they are covered with a white substance like powder. This is not, as is generally supposed, the work of insects, but arises from the stagnation of the juices, which occasions corruption; and this attracts certain insects, which then deposit their eggs upon the surface of the leaves: such is the received opinion upon this subject; for, so soon as this corruption commences, innumerable insects will flock to a tree, without any other apparent cause of attraction. As the stagnation of the juices is the first stage to corruption, the weakest trees and those placed in a disadvantageous situation are most subject to what is called mildew: if insects were the cause of it, art could not produce it; whereas, by wounding or neglecting a tree designedly, the mildew will follow; this unfortunate tree will soon be covered with millions of insects, while those surrounding it shall be free from their ravages.

A glutinous matter, corrosive in its nature, and somewhat resembling dew in appearance, is oftentimes observed upon plants: this is called honeydew. This dewy substance was for a length of time supposed to be the work of insects; but opinion is now different, and it is said at present to be deposited by the air, and may arise, consequently, from noxious vapours of some kind. In some countries it is deposited in the form of drops, and is found indifferently upon all kinds of plants; it frequently happens that a whole range of trees will be affected with it in one night. It may arise from the corruption of the juices, and insects may be in part the cause of the mischief that arises from it; for it is always the weakest part of the tree, such as the leaves, the twigs, the buds, which are most affected by it: the leaves upon which it is most found shrivel up, turn black, and wither.

The hand of Providence is here most visible; for, since it is necessary that insects should have food, it is advantageous to us that they should be attracted by that which would be of no use as a subsistence for man. This is a proof of the tender care of Providence in his arrangement of the economy of the world: by virtue of this arrangement, animals do not deprive us of those provisions which are necessary for our support, but, on the contrary, attach themselves to those which would be prejudicial to us; every plant, every tree, it is true, serves as food to some animal, but not to that degree as to interfere with the comforts of man.

Those creatures which do hurt or injure us we destroy, sometimes, it is to be feared, without considering that all the powers of the world united cannot restore that life to the smallest insect which we so wantonly crush beneath our feet.

JULY 30.

MEANS OF SUBSISTENCE WHICH NATURE PROVIDES FOR ANIMALS.

It is one of the greatest effects of the bounty and power of the Almighty that an ample supply of food is provided for the innumerable creatures which inhabit the globe: it is not, indeed, so surprising that the temperate zones should so abundantly provide for the animals peculiar to them; but that, in every part of the world, in those places where we should least expect it, an abundance of food should be found, so that it never fails, is one of the most astonishing effects of the interference of Providence for the good of his creatures.

God has everywhere provided sufficient for the consumption of animals, but not with a lavish profusion, so that waste should result; and, amidst the great variety of foods which is found in every part of the earth, those which are most useful are most abundant: for instance, look at the profusion which clothes our fields and meadows—look at the variety of grasses and salutary plants with which they abound, and this because the greater part of quadrupeds feed upon herbage. And is it not worthy of attention that the different species of corn which constitute the support of man can be cultivated and propagated with comparatively but little labour? For instance, if one bushel of wheat be sown in a good soil, it will yield one hundred and fifty bushels.

The different tastes of animals are also as beneficial as wonderful: some feed upon grass; others upon corn; others, again, upon meat, insects, or other animals; some are voracious; others are soon satisfied. If all kinds of animals subsisted upon the same food, the world would soon become a desert. This variety of taste cannot be the result of chance, because it would then be capricious and uncertain; but it arises from an instinct given to animals by their great Creator, by virtue of which they all find a sufficient portion of food for their existence. Every production of the earth and sea is by this law proportionably distributed; not only every thing which breathes, but things corrupt and hurtful are turned to account. Unless the Almighty had so ordered that the dead bodies of fish, insects, birds, quadrupeds, and even vegetables should serve as food to some kind of animal, the exhalations from these putrid substances would infect the air and fill it with pestilential vapours.

The food of animals is generally ready prepared for them, yet some degree of art is necessary to discriminate between the different kinds which are offered to them. Botanists have discovered that oxen eat of two hundred and seventy-seven kinds of grasses, and that they reject two hundred and eighteen; goats eat four hundred and forty-nine, and reject one hundred and twenty-six kinds; sheep feed upon three hundred and eighty-seven, and there are one hundred and forty-one kinds of grass that they will not touch; the horse, out of four hundred and seventy-four kinds of grass, rejects two hundred and twelve; swine are contented with seventy-two vegetables, and there are one hundred and seventy-two they will not eat. Other animals are compelled to seek their food with labour and toil, to grub up the earth, to gather it together when it is scattered, or to find it in a foreign element: some seek it in the darkness of the night; others labour to provide a winter store; and others, again, make use of cunning and address in order to entrap their prey. Earth, air, and water abound with living creatures and food for their support.

This variety in the food of animals is truly admirable, and discovers the fatherly care of the Almighty for all his creatures. And we, my dear Readers, how much reason have not we to celebrate the praises and glory of our heavenly Father!

JULY 31.

VARIETY IN THE STATURE OF MANKIND.

The height of the human form varies considerably, generally from five to six feet. The inhabitants of the North Pole are less than five feet; but the shortest men are found in the interior of the island of Madagascar; they are barely four feet high: yet these people derive their origin from nations of an ordinary stature, and the principal cause of their degeneracy must be considered the ungenial nature of their climate. The cold is there so excessive during the greater part of the year that the vegetables and animals are alike diminutive: why should not the climate have the same influence upon man?

There are, on the contrary, nations resembling the description of the giants of old: the Patagonians, who inhabit the coast of Magellan, are eight and nine feet high. And why should there not be people of larger dimensions than the Europeans? History and the monuments of antiquity confirm the possibility; even in our own country persons have exhibited themselves, of a very superior stature, yet well made and of good proportions, enjoying health, and capable of performing those labours which require skill as well as strength.

O thou great and adorable Being! thy wisdom is preeminent in all thy works. All that thou hast produced in the animal, vegetable, and mineral kingdoms are alike perfect in weight, number, and measure; they all bear the stamp of thy image, the dwarf as well as the giant, the blade of grass as well as the oak, and the crawling worm as well as the stately elephant.

AUGUST.

1. Meditation on the works of God.—2. Love of gardens.—3. Sirius, the dogstar.—4. Sleep.—5. Divisibility of bodies.—6. Construction of the limbs of insects.—7. Senses of man compared with those of other animals.—8. Thunder.—9. Meadows.—10. Injuries arising from animals.—11. Diversity of colours.—12. Habitations of the beaver.—13. Nutrition of the human body.—14. Different aspects of nature.—15. Damages occasioned by rain.—16. Care of animals for their young.—17. Extraordinary rains.—18. Sensibility of plants.—19. Fear arising from storms.—20. Summer the image of death.—21. Heat of the weather.—22. Variety of plants.—23. Animal kingdom.—24. Division of the earth.—25. Properties of light.—26. Structure of birds.—27. The heavens.—28. Wheat.—29. Shells.—30. The government of God.—31. Harvest Hymn.

On either side the tall grain
falls beneath the sharp edge of his
sickle, ———
20th Day.

AUGUST.

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STURM'S REFLECTIONS.

AUGUST 1.

MEDITATION UPON THE WORKS OF NATURE.

O THOU Almighty Creator of the universe!—Thou who preservest every thing which breathes, how great is thy majesty! How wonderful, in the eyes of man, are thy works! Thine all powerful arm stretched out the heavens and spangled it with stars.

To-day I behold the sun in all his glory:—to-morrow his beams may shine, but not, perhaps, for me; the birds may chant their songs of praise, the hills, the dales, the woods may echo back their hymn; but I am mortal, my life fades like the grass of the field, it decays like the leaf torn from its native stem by the rude blasts of winter. Who is there can know the time when the decree of the Most High shall come forth—"Return, O mortal! to thy native dust?"

When the tomb shall enclose me — when darkness and silence surround me—when the worms shall have devoured me, what then will remain of all my worldly possessions? All will be lost to me for ever, even though I should have tasted happiness unalloyed during my pilgrimage on earth. Oh! how foolish should I be if I attached myself to the frail fortunes of this transitory life, if I were ambitious of great honours, or aspired to extraordinary wealth!—or if, dazzled by the false splendours which surround me, I should become envious and proud!

Oh thou dread Omnipotent! if, misled by vain wishes, I have pursued honours to which I had no right to aspire, I prostrate myself before thee with the deepest humility. Behold me at the foot of thy mercy-seat: do with me as it shall seem good unto thee.

Man, presumptuous man, urged on by pride, prescribes laws to his Creator, and condemns the decrees of eternal wisdom! And yet, O thou preserver of souls! thou dost love this presumptuous being more than he loves himself, when thou dost refuse him the chief object of his wishes.

At the morning's dawn, when nature, refreshed by the dews of night, smiles around and revives afresh, she cries aloud—"O mortal! why art thou a prey to care and anxiety? Is not God thy father? Shall he who made thee forsake his child? The term of thy existence is not confined to thy pilgrimage on earth; it extends to eternity. Life is but a span, and the longest stage of terrestrial felicity is but, as it were, a happy dream: thy destiny, O man! is to become immortal."

Immortality! Transporting thought! The

world, the whole universe, time itself shall cease to be when immortality commences. Rouse thyself, my soul; let this thought act as an alarum to thy conscience when assailed by dangerous temptations.

The roses which crown the wicked quickly fade and die: the pleasures of the vicious are succeeded by repentance. I am but a sojourner on this earth; but immortality is my portion, and that alone is worthy of engrossing all my thoughts.

Give me, O thou bestower of all good! a heart glowing with virtue and holiness. Let others seek vainglory: I ask but this—to be content with my estate, faithful to my duty, and to be considered worthy the name of Christian.

AUGUST 2*.

THE LOVE OF GARDENS.

If the country charms us with the beauty of its productions, it pleases us no less by the variety of amusements it affords. Innumerable are the examples which we might bring forward to prove that the love of nature, and particularly when she is somewhat assisted by the labours of man, has constituted the chief pleasures and delight of men of eminence of all ages, professions, and religions: Nero, that cruel tyrant, is said to have hated Seneca more on account of the superior gardens of the latter than from any other cause; and Cyrus, the Median hero, himself laid out the plan of his exquisite garden at Sardis, and planted many of the trees and shrubs with his own hands. "What!" exclaimed an ambassador, who was wandering through its high arched bowers and flowery paths, "What! is it possible that your Majesty, so magnificently clothed with strings of jewels and bracelets of gold, could employ yourself in planting flowers and trees?"—"I swear by the god Mythras," replied Cyrus, "that I never devote myself to the pleasures of the table till I have induced a profuse perspiration by military exercise or rural employments; and, when I apply to those engagements, I never spare myself." "Ah!" said the ambassador, presuming to take Cyrus by the hand, "you alone are truly happy and deserve your station."

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* The subject chosen by M. Sturm for this day's meditation is the same as that for the twenty-ninth of June: the Translator has therefore ventured to substitute "Reflections on the love of gardens." The anecdotes are extracted from an interesting work, entitled "The Beauties, Harmonies, and Sublimities of Nature," by C. Backe, Esq.

Charles the Twelfth of Sweden cultivated his garden with his own hands; and Cyprian lived in a garden at a small village in the neighbourhood of Carthage. St. Augustin was equally attached to the beauties of nature and the pleasures arising from the contemplation of a flower garden:—"One day," says he in his confessions, "as I was looking out of my window, I fell into a discourse with my mother respecting the nature of eternal felicity; and, drawing inferences from the flowers and shrubs before us, I proceeded to a consideration of the sun and stars; and, thence meditating on the glory of the celestial regions, we became so ravished with our contemplations that, for some time, we forgot that we were inhabitants of the earth."

Descartes, whose mind was at all times serene as the summer lake, passed his evenings in the cultivation of a small garden: having settled the place of a planet in the morning, he would amuse himself in the evening by watering a flower.

Fontaine was equally attached to the calm pleasures afforded by a garden. One morning the Duchess of Bouillon, niece to Cardinal Mazarine, saw him, as she was going to Versailles, sitting in an arbour, so entirely abstracted that he scarcely perceived her: as she returned from the palace in the evening, Fontaine still occupied his seat, though it had been raining the chief part of the day.

A poor man of the name of Morgan, who had worked for thirty years in one of the furnaces of Monmouth, and who was a perfect Ethiop in appearance, was nevertheless so attached to his garden that, although the whole of the day and part of the night were devoted to his laborious occupation, yet he found time to cultivate a garden: "The greatest delight in the world," he observed, "was a garden; and the best ornament a poor man can have in that garden is a hive of bees."

Do we not in this love of nature behold the secret workings of the invisible spirit, diffused alike through the rich and poor, the sage and the unlettered? Great and merciful are thy ways, O Lord! The pleasures of a garden are within the reach of all degrees of men; and in the contemplation of nature's fairest flowers the mind acquires a taste for pure and simple enjoyments, unmixed with the baleful passions of the world, and partaking in a faint degree of those pleasures which, in bowers of amaranth, will constitute a portion of happiness throughout eternity.

AUGUST 3.

THE DOGSTAR SIRIUS.

THE Sun, independently of its diurnal motion, which appears to carry it from east to west, and which also occasions day and night, has apparently another motion from west to east, by virtue of which, at the end of three hundred and sixty-five days, it again approximates to those stars from which it had been during six months receding and the other six months approaching. From hence arose the division of the heavens by the ancients into twelve parts, called "the signs of the zodiac:" they were also called "the hours of the sun," because he appeared to sojourn in each during one month. Summer begins with us when the Sun enters the sign of the Crab, which happens on the twenty-first or twenty-second of June: the Sun has then attained its greatest elevation with regard to us, darting his rays upon us with considerable strength; and this is generally the hottest time of the year: the heats of July and August are more intense than those of the preceding month. Of all the stars with which the Sun comes in conjunction Sirius, the Dogstar, is the brightest.

These observations would be of little importance if they were not intended to combat certain prejudices, which have taken deep root in the breasts of no small part of mankind: the heat at this season of the year is erroneously attributed to the power of the Dogstar, and accompanied, at the same time, agreeably to tradition, by the most baneful influence. This is truly absurd, since the occultation of the Dogstar in the rays of the Sun does not always take place in what we call the dog days: they begin towards the end of August, and terminate about the end of September; and, as the Dogstar keeps continually advancing, it will, in the course of future ages, reach the month of October, and even January; so that the dog days will, in fact, take place at the coldest season of the year. To suppose, therefore, that Sirius turns our beer and our wines sour—that it affects men and animals with maladies, and even madness, is truly ridiculous: these misfortunes arise from the heat of the weather, which the Dogstar can in no possible way affect.

The judgment of that man must be shallow indeed to suppose that certain groups of stars, which the imagination has conjured into certain figures, should have any influence upon our globe or the destiny of mankind! It is not our stars, but ourselves whom we may accuse as the cause of our misfortunes and maladies. And is not this popular but erroneous opinion of their influence an insult to the providence of God? Can we imagine that a Being, whose divinest attribute is mercy, should have created any thing, either in heaven or in earth, for the sole purpose of tormenting and injuring his creatures? Would not this opinion imply the belief of an irresistible fatality? Rather let us bless God for his consoling assurance that he will be our father and we shall be his children—that his eye is constantly watching us, and that not even a hair of our head shall fall to the ground without his permission.

AUGUST 4.

SLEEP.

We sink gradually into sleep, with more or less rapidity, according to the degree of health we are in; but, whether sleep overtake us slowly or quickly, it makes its approaches in the same fashion, and the circumstances which precede it are the same in all men.

The first and last thing of which we are sensible when sleep overtakes us is the inaction of the senses, which no longer receive external impressions, and by degrees fall into a state of inertness: from hence it results that our attention diminishes, our memory fails, our passions become calm, and our thoughts and reason seem totally to have forsaken us. While we are conscious of sleep we do but dose; for, so soon as we sleep, every thing becomes to us as if it were not. The stupor of the senses is followed by the relaxation of the muscles: this is the second step towards sleep. This state is accompanied by several symptoms, which may be observed in persons sleeping in a chair: the eyes wink, opening and shutting involuntarily; the head totters and falls forward. We endeavour to prevent this; but it stoops the lower, and we have no longer power over it to command its motions. The chin finally rests upon the chest; and in this position we sleep tranquilly: whilst, however, the head moves from side to side, the muscles are not totally relaxed. In profound sleep all our voluntary and animal functions cease; but the natural and vital organs act with increased vigour when the body is at rest. The preparation of the humours by the chyle is best effected while we sleep: while we are awake our natural movements are sometimes troubled by our voluntary ones, and the motion of the fluids is augmented in some vessels and relaxed in others; the blood is wasted, as it were, in external actions, and consequently the internal parts of the body do not receive their due proportion: the circulation of the blood is very strong in those parts which are in motion, pressing continually the humours into the secreting vessels; while in others, on the contrary, it is so feeble that the chyle can scarcely be changed into blood. A gentle sleep remedies these bad effects: the vessels are equally opened, the juices flow freely, the same heat is universally diffused; in a word, nothing is lost, every thing is converted to its proper use. Hence it is that, after a long sleep, we are rested, refreshed, and strengthened.

These reflections are very proper, my dear Reader, to excite our gratitude towards God for his unceasing goodness towards us. What preparation, what tender care to procure for us the benefits of sleep! The total numbness of our senses, the gradual approach of drowsiness are both wonderful and beneficial: the former renders our sleep more sound, the latter makes it an act of necessity. And what wisdom does the relaxation of our muscles during sleep display! The first which loses its tension is that destined to protect one of our most precious organs, the eye: so soon as we are disposed to sleep the eyelid closes of itself, covering and protecting the eye till we awake. In some other parts of the body the muscles do not relax to this extent, as danger might be the result.

Let the approach of the hour of rest be always hailed by us, as the hour of grateful acknowledgment towards our Heavenly Father for his never failing goodness. Let us praise and bless him, not only that our days peaceably succeed each other, but that he has instituted sleep for our strength and refreshment. Let this be the last of our waking thoughts, and the first of our morning meditations.

AUGUST 5.

DIVISIBILITY OF BODIES.

YOU can easily, my dear Reader, and without much trouble be convinced of the infinite divisibility of bodies, by walking in a garden, and inhaling the divers perfumes which arise from the plants and flowers. How infinitely small must be the odoriferous particles of a pink, which exhale and spread themselves so far around! If this experience is not sufficient, glance at some other object of fertile nature—the silkworm's silk for instance:—This silken thread, though three hundred and sixty feet in length, will weigh but one single grain, that is to say, the seventy-second portion of a dram. Imagine, then, into how many parts this length of thread may be divided and still be visible: an inch may be divided into six hundred equal parts, each of which may be the size of a human hair, and consequently can be seen with the naked eye. A single grain of silk contains, then, 2,592,000 parts which can be seen without the aid of a microscope; and, as these parts can be subdivided into twice as many or perhaps more, this progression may be extended beyond all calculation; for, although invisible to mortal eye, they still possess actual substance.

If we direct our examinations to the animal kingdom, we shall find new proofs of the astonishing divisibility of matter: a grand naturalist, having put some pepper into water, discovered in it, by means of a microscope, a multitude of animalculæ, a thousand million times smaller than a grain of sand. What, then, must be the diminutive size of the feet, the organs of sense, the muscles, the veins, and the nerves of these little animals? What size would be their eggs, their little ones when first hatched? Our imagination even cannot comprehend this: we are lost in the infinity of God's works; for there is no contradicting such proved facts. The more the productions of nature are magnified, the greater does their beauty and regularity appear; while, on the contrary, the most polished works of art appear, upon a microscopic examination, rough, coarse, and imperfect, although they have been executed by the most ingenious workman. Thus has the Almighty stamped upon the smallest of his works marks of his infinity: the most subtile body is like a world, in which millions of parts are united and arranged in the most perfect order. What astonishing wisdom must that be in which the minutest objects are constructed upon a plan as extensive in its effects as those of the greatest magnitude! What must that power be which could, from nonentity, produce so many wonderful creatures! What a profusion of goodness does not the Almighty display in the smallest of bodies, which are perfect in all their parts!

O my God! how do these reflections proclaim my own insignificance and limited understanding! The smallest worm, the smallest insect, a grain of dust must convince me that there are a thousand things in nature which I cannot explain. Endeavour, O man! to calculate the parts which compose the body of an animalcula which is a thousand times smaller than a grain of sand!—Determine, if you can, what must be the subtilty of a ray of light, several millions of which can pass through the small space of a pinhole! Your efforts will be in vain, your ideas will become confused, and you will be compelled to acknowledge your ignorance. And you dare be proud of your limited knowledge! You have the presumption to condemn the ways of the Lord, and to point out imperfections in the arrangements he has made! Can you flatter yourself that you are acquainted with the thousandth part of created beings? Oh, my dear Reader! an acknowledgment of our ignorance upon this extensive subject should constitute our duty and glory.

Such should be the reflections resulting from this meditation: for me, I will never contemplate the divisibility of bodies without acknowledging the power and majesty of the Almighty and my own insignificance.

AUGUST 6.

EXTERIOR CONSTRUCTION OF THE LIMBS OF INSECTS.

In general we consider those animals worthy of our attention only which are distinguished by their size, as the horse, the elephant, the bull, &c.: those smaller animals which people the air, vegetables, and the dust, we disdain to look upon. What a number of insects we crush under our foot! and how many caterpillars do we destroy! How many flies flutter around us without exciting a sensation, except that which impels us to destroy them when they molest us! How foolish is this insensibility, since the wisdom and power of the Creator is as manifest in the construction of a worm as in that of the elephant, the horse, or the lion.

The bodies of the greater part of insects are composed of several rings, folding the one upon the other, and which assist the creature in all its movements; but the essential and distinguishing character of all insects is that they have no bones, properly speaking. In this arrangement we can discover traces of infinite wisdom: the motion common to all insects, the manner in which they seek their food, and, above all, the divers metamorphoses they undergo could not be executed with so much facility if, instead of these flexible rings, their body was connected and strengthened by bones.

Several insects have the power of enlarging and lessening their heads, of extending or shortening them, and even of concealing them for a time, and afterwards protrude them: the heads of others are always of the same form. The mouths of insects are generally furnished with one tooth, or else with a trunk.

Many insects are totally deprived of sight; but their sensation of feeling or some other sense is the more exquisite as a compensation. They have also two kinds of eyes—those which are shining and bright, and which are few in number; and those the retina of which resembles network or shagreen: the cornea of these is formed like the cutting of a raw diamond. The latter eyes are sometimes very numerous: neither kind is movable; but their number and situation supply this defect. The antennæ with which insects are provided are very useful: these horns, by projecting far before the body of the insect, warn it of danger, or point out its food.

The legs of insects are either scaly or membranous; but some of these curious animals have both kinds: yet those which have even a hundred feet do not move faster than those which have only four. The various ways in which their feet are constructed, according to their several natures, are very curious: the legs of insects which cling to highly polished surfaces differ greatly from those which leap, or those which dig their way into the ground.

Two or four wings are generally placed in the middle of the body: of these some are thin and transparent as gauze, some scaly, and others are formed of one piece of scale, acting as a defence to the more delicate wings; the latter, however, sometimes are without any thing to cover them, as those of the dragonflies. On the sides of the animal or at the end of the body there are little eyelet openings, called stigmata, which perform the office of lungs.

The variety in the construction of this race of animals is infinite, and it would occupy the lives of succeeding generations accurately to describe their figure. How different the shape of those which crawl, leap, fly, or walk! And yet, however varied their figure may be, they are all patterns of order and perfection.

And can we be so perverse as not to see, in this wonderful arrangement, the hand of supernal wisdom? We cease to be rational creatures when we refuse to acknowledge the majesty of God in all things, when we refuse to adore his holy name.

Oh! grant, Lord, that I may never fail in the fulfilment of this duty. When I contemplate the wonders of thy hand in the structure of an insect, may I never fail to give thee glory and honour, O thou Most High!

AUGUST 7.

COMPARISON OF THE SENSES OF MAN WITH THOSE OF ANIMALS.

Are there any animals the senses of which are more perfect than those of man? It is only in particular cases that we can answer to this question; for, generally speaking, man in this respect is more favoured than the brute creation. The bee and the dog are endowed with a peculiar acuteness of smell; and the former, by the fineness of this sense, pursues his game, and some are taught to discover the truffle, though under ground, by means of this faculty. Swine, also guided by their smell, grub up the earth where they can find food. Stags are said to distinguish the sound of bells at a considerable distance; and the mole hears better underground than man, who is upon its surface, and lives in the open air. The eagle, among birds, and the lynx, among beasts, greatly surpass us in quickness of vision. These observations are founded upon experience; but, if we consider animals collectively and comparatively with man, we must be struck by the prodigious superiority which the latter enjoys over the brute. Man is endowed with five senses: above the one half of the animal creation are denied this privilege. The zoophytes, the link which joins the animal and vegetable kingdoms, have only one, that of feeling. Some animals have two, some three, and a few five; and these latter are classed among the most perfect of the brute species.

But the most perfect animals are not always gifted with more acute senses than those of man. Among mankind some persons are endowed with extraordinarily fine senses: an Indian by his smell will tell how much alloy a metal contains, and this as correctly as we should do by the touchstone; others among them will scent at a great distance the dwelling of a wild beast. The inhabitants of the Antilles will distinguish by their smell whether a Frenchman or a black has crossed their path: the susceptibility of their senses supplies their deficiency in intellectual faculties. Many persons have refined their senses to a surprising degree; and if man, like animals, had no other means to procure food or shelter himself from danger—if reason were not his surer and more perfect guide, his senses would, no doubt, attain the highest degree of perfection. But there is no necessity for his possessing such exquisite sensitiveness; reason compensates him a hundredfold for any superiority the beasts may appear to possess over him in this respect: indeed, if our senses were more acute, the most painful consequences would be the result. Let us take for example that of hearing: if this sense were as acute with us as it is with those animals whose safety demands it, we should be stunned with noise—it would be impossible that we should follow our occupations in peace.

Praise be to the infinite Creator of the universe, for his goodness in having so arranged the extent of our sensations that they do not interfere with the more noble occupations of our reason! The limited state of our senses is no loss: on the contrary, it is rather a perfection. Happy he who abandons his senses to the government of his reason, and who enjoys the happiness naturally resulting from their union.

AUGUST 8.

THE THUNDER.

THE thunder rolls. Who is it, O mortal! that bids the thunder roar? Who is it that bids the lightnings flash? Listen, O sinner! It is the Creator of the universe—it is the arm of the Most High which hurls the thunderbolt. Nature reposes and is at rest: he preserves and blesses it; but at his voice the earth shall be devoured by flames, the heavens and the earth shall be no more.

Again the thunder rolls. How portentous is the gloomy sky! Again the lightnings glare. How great art thou, O God! and how dreadful is thy power!

The Eternal from above darts his wrathful countenance upon us; and by the lightning's flash we behold the tomb yawn to receive us.

When the Almighty rides on the clouds the earth trembles: when his wrath is kindled the whole universe shakes to its foundation. God thunders and the sinner trembles: secretly does he raise his eyes to him who proclaims his threats in clouds and storms. But to thee, O Christian! though he rides on the stormy whirlwind amidst the lightning's glare, to thee he is the God of love.

When the wicked tremble at the raging tempest thy God watches over thee, and spreads out his protecting arms to shield thee.

And, although he should even deprive thee of life, are not his judgments just? He is thy Lord; and thus shouldst thou address him:—"My soul is tranquil, O my God! Whether I live or die, my hope is in thee."

The Lord of Thunder is the God of Christians; and, if he think fit to take me from the living, what should I fear? I know that he is merciful and bounteous, and will raise me to eternal happiness.

He who lifts his voice in songs of praise when the sky is decked with heaven's clear azure will be calm and tranquil when the sinner, appalled at the stormy sky, flees to the rocks and caves for shelter.

But whither shall he flee? Can he escape the piercing ken of the Immortal? In vain he courts security in the gloomy cavern: the lightnings overtake him in his last retreat.

Flee not, O sinner! but renounce thine errors: think not to conceal thyself from the Most High, who is ever present. When the thunder rolls, terrors overwhelm thee: when the storm is stilled, pleasure again betrays thee.

If thou wilt obtain pardon, O man! bless the Lord for his goodness towards thee; recall thy resolutions in the hour of agony, and remember God will not be mocked.

The Almighty is merciful and spares the sinner; but he will not always spare: the eternal God is just, and the supreme Judge will assuredly cite the sinner before his dread tribunal. What is the thunder which rolls over our heads, in comparison of that awful day when we shall hear the rush of winds and waters, when the elements shall be dissolved by that devouring fire which shall consume the world and all which it contains.

AUGUST 9.

A MEADOW.

YE gloomy and majestic woods, ye lofty pines and stately oaks, ye purling streams and trickling fountains, ye towering rocks and crested mountains, it is not you which claim my song: the verdant meads and the enameled plains, these shall excite my transport, and teach my voice the song of praise.

What beauty, what variety is spread before me!—thousands of vegetables, millions of living creatures! These flutter from flower to flower, others are lost in the thick tufts of grass: infinitely various in their figure and in their beauty, all these insects here find an ample supply of food; and, however contemptible they may appear, they are all perfect in their kind.

Gentle are thy murmurs, thou limpid rill, amid smooth ivory pebbles: thy banks are bordered with thick grass, intermixed with flowers, which, bending over the waves, are reflected in all their beauty. I too bend forward to view the effect of this diminutive forest. How beautiful the tints thrown by the sun upon nature's lovely green! Plants of exquisite delicacy are here interwoven with the grass, or, lifting their towering heads above their companions, ostentatiously display their beautiful but scentless flowers; while the humble violet, sheltered by the barren rocks, spreads forth the richest perfume. Such is the poor and virtuous man; while the rich and great, clothed in purple, often consume in idleness the goods of this terrestrial world.

Winged insects pursue each other through the mazes of the grass, sometimes lost from my view: at others they soar above me, and wanton in the sunbeams.

What is that variegated flower which wavers near the stream? How lively its colours! how beautiful! I approach it and smile at my simplicity: a butterfly escapes, and quits the blade of grass its light weight had shaken. That blue bell droops its azure head, sinking beneath that buzzing insect clad in a black coat of mail and adorned with transparent wings.

What is that noise I hear? Why do those flowers incline their heads? Ah! I see a swarm of young bees has settled on them; they have quitted their home; they have come from afar to wanton in this flowery meadow; they flutter on busy wing from flower to flower, collecting delicious nectar, which they will soon deposit in their cells: idleness is unknown to this busy race of insects.

There, on a tall clover blossom, a beautiful butterfly waves his gladsome wing; proud of its charms, it views itself reflected in the clear stream. Thus does the youthful beauty bend before the lovely image her mirror reflects; yet her dress is less splendid than thine, thou fluttering insect; but she is gay and thoughtless as thou art.

Look at yon worm crawling on the grass: all the researches of luxury, all the efforts of human art could not imitate the green and golden hues which cover its wings, in which all the tints of the splendid rainbow unite.

Oh! how beautiful is nature! The enameled fields spread a thick carpet for us; the lofty forest extends a lofty canopy over us; the gentle zephyrs fan their light wings; the flocks graze around, and the tender lambs leap and bleat for joy; every spray is jeweled with a glittering dewdrop; the nightingale's sweet song echoes from the neighbouring hill; every thing speaks joy, every thing inspires it; it reigns in the hills and the valleys, in the woods and the mountains. Oh! how beautiful is nature! He who is insensible to her charms must have become the prey of base desires, and has thereby deprived himself of the purest of pleasures.

Happy he whose life is passed in the enjoyment of the beauties of nature! All nature smiles on him, and joy and happiness await him in every clime; every flower, every blade of grass is for him a source of happiness. Happy he who delights in such innocent joys: his mind is serene as a fine summer day; his affections are sweet and pure as the perfume of the flowers which surround him. Happy he who in the beauties of nature discovers its great Creator, and devotes himself to his praise.

AUGUST 10.

INJURIES ARISING FROM ANIMALS.

It is lamentable to observe that so many productions of nature, and often those the most beautiful, are exposed to the ravages of animals: summer never passes away without giving us ample proof of the injury which the vegetable kingdom sustains from birds, insects, &c. How many plants and fruits are consumed by worms, maybugs, and caterpillars! Of how many things necessary for our subsistence do the destructive sparrow and the insatiable crow deprive us! How sad is it to behold a field devastated by rats and grasshoppers!

Such complaints are often made by mankind, who imagine that certain animals have been created solely for their torment. These complaints have apparently some foundation, since it cannot be denied that many animals do exist which are injurious both to men and plants; and among these, insects may be considered as the most destructive: it is, indeed, easier to exterminate wolves, lions, and other wild beasts than to destroy an army of locusts, &c. when they spread themselves over a country.

In Peru there is a species of ant called the chako, which is a perfect scourge to the inhabitants, whose lives even would be endangered by the rapacity of this insect if certain precautions were not taken against its ravages. The ravages of caterpillars on trees, and of mice in fields, are too well known to be mentioned.

Yet, however great these inconveniences may be, they do not authorize our unlicensed and unqualified complaints. We are delighted to see one animal destroy another—we hold ourselves at liberty to kill animals, not only for our food, but also when they annoy us; yet we cannot bear they should take the smallest particle from us. The voracity of animals is by no means so injurious as we may suppose: of this I will give you, my dear Reader, some examples.

Some years ago the English colonists of North America began very seriously to extirpate the race of jays, because they supposed these birds did great damage to their various grains: as they proceeded in their work of extirpation they were surprised at the enormous number of worms, caterpillars, and particularly the Maybugs, which committed such ravages in the cornfields as to be truly alarming: the persecution against the poor jays was now stayed; and, as the birds increased, the insects disappeared. The like attempt was made in Sweden upon the crows; but the Swedes were soon glad to stop proceedings against them. In South America the sparrow was pursued with such unremitting perseverance that the ants increased to that degree that many cultivated lands were so ravaged by these insects that it became impossible to raise crops of any kind upon them, and they are now fens and marshes. The island of Procida abounds with pheasants; and the King of Naples, who delighted much in this bird, passed a decree that no cat should be kept in the island, lest they should destroy his pheasants: the natural consequence of this decree was such an inconceivable increase of rats and mice that nothing eatable could escape their ravages: the decree was then repealed.

Besides, have we any right solely to engross that part of nature's productions which the God of nature liberally intended for the consumption of all? Are our wants and pleasures less satisfied because birds and insects and other creatures partake with us of those gifts Providence has so bountifully scattered around us? Are we so presumptuous as to affirm that such and such creatures are not only useless but destructive, merely because our understandings are so limited we cannot discover the ends for which they are and were created? Rather let the apparent disorder and irregularity which we may observe but cannot comprehend induce us to lift our eyes to that great Being who has made nothing in vain: a thorough conviction of this important truth would teach us to praise and glorify God under all circumstances, however incomprehensible they may appear.

AUGUST 11.

DIVERSITY OF COLOURS.

How dismal and sad the gardens and fields would appear were they all of the same tint! How confused would every object become unless diversified and relieved by a variety of hues! In this reflection I behold the goodness and wisdom of the Almighty. If he had not intended that our terrestrial dwelling should possess an infinity of beauty for our amusement, why should he have adorned it with such a lovely, such a brilliant variety?

The sky and all those objects which are far from us are painted with dazzling magnificence; but those objects which were destined for our close examination are touched and finished with a delicacy beyond all description: such are insects, flowers, birds, &c.

But from whence is this distinction of colour derived? Every ray of light appears to be single, but by refraction it is greatly subdivided; and hence arises that variety in colours which we everywhere see. A glass filled with water and exposed in the sunshine will throw certain colours upon a sheet of white paper; cut glass, under the same circumstances, produces more brilliant hues; and, by holding a prism or triangular glass towards the sun, or receiving upon it a ray of light entering a chamber through a small hole, we shall see the most beautiful rainbow: as the refraction of the rays is more or less strong, the colours will be more or less vivid.

The most refrangible colour is violet; and consequently it must be the faintest. Next appears indigo, followed in succession by pale blue, green, yellow, orange, and red: the latter possesses the least refrangibility of any colour. Yet the nature of coloured bodies assists also in producing this variety of colours. The smallest parts of nearly all bodies are transparent; hence it happens that they break, absorb, or reflect the rays of light differently, in the same manner as do cut glass or prisms. A proof that colour is not inherent in coloured bodies may be derived from observing the neck of a pigeon, a peacock's feather, or even those silks called shotsilks, which change their colour as their position is changed. The theory of colours is by this observation reduced to a simple process, which may be resolved thus:—The surface of all bodies is composed of exceedingly fine and invisible layers, which, according to their several thicknesses, reflect certain coloured rays, whilst they absorb others in their pores: hence, when a body is so smooth as to reflect or throw off the rays of light, its surface appears white; on the contrary, when the rays are absorbed, the object appears black.

What admirable wisdom, what unlimited goodness does this arrangement display! If the rays of light did not separate, if they were not differently coloured, all nature would wear one uniform, and we could only distinguish one object from another by the help of our reason and by the circumstances of time and place. And what perplexity would this produce! What trouble! Our lives would be passed in supposition instead of action, and we should constantly be involved in uncertainty: our eyes would soon grow fatigued with looking upon one and the same colour, whereas from the lovely colours with which the Almighty has beautified and diversified nature we are constantly deriving pleasure and amusement.

This is, indeed, a convincing proof that God, in the formation of the world had more in view than to produce for us mere objects of utility: brilliancy of colour, variety of form, and difference of sounds may be classed among the ornamental parts of the creation, while their utility may be considered as constituting the essential merits of God's works. The variety of tints displayed by an extensive landscape are no ways essential to its utility; but what pleasure and delight do they not impart! Oh! how boundless should be our gratitude for all the mercies bestowed upon us by the Most High!

AUGUST 12.

HABITATIONS OF THE BEAVER.

If a person who had never heard of the industry of the beaver were to be shown their habitations, he would immediately conclude they were the work of man: every thing, indeed, is truly wonderful in the labours of these amphibious animals. The regularity, size, solidity, and the admirable art which the construction of their dwellings display cannot fail to excite the astonishment of an attentive observer.

The beavers fix their habitations where they can have a plentiful supply of provisions, and situated near a stream in which they can form a reservoir for bathing. They begin by constructing a dam; on this they build their habitations, the groundfloor of which is level with the water. This dam is sometimes twelve feet thick at the base, but sloping to about two feet broad at the top; it is composed of wood and clay: the former the beavers cut down very easily, and, fixing the posts perpendicularly in the bed of the river, and very close to each other, they fill up the interstices with smaller branches, which they plaster over with clay, both within and without, and thus prevent the water from flowing off. This dam or dyke is sometimes eighty or one hundred feet in length.

After the dyke is completed they commence their habitations, which are usually circular or oval, composed of three different apartments one over the other: one of these, which is generally below the level of the dam, is mostly full of water; but the two others are above it and dry. These little edifices they construct with great solidity on the brink of their lake, and always in stories, that, if the water should rise, they may be able to ascend above it. Should a small island be near their watering place, they will build their habitation on it; and here the animals are not exposed to many inconveniences from the water, in which they cannot remain for any great length of time: should they not meet with this advantage, they force poles into the earth with their teeth, to protect their edifice against the violence of the wind and water. At the bottom they have two apertures towards the water, one leading to their bathing place; the other serves as an avenue through which to carry off whatever would soil their apartments: higher up they have a third opening, as an outlet when the lower ones are blocked up with ice. Sometimes they build their houses entirely on dry land, and dig trenches five or six feet deep down to the water. The dimensions of these habitations are proportioned to the number of the beaver family: thus, a space twelve feet long and ten broad is sufficient for eight or ten beavers.

The only tools which the beaver possesses are four strong incisive teeth; the two fore feet, the toes of which are separated, and provided with long sharp nails; the two hind feet, which are webbed; and a scaly tail, resembling a long trowel. With his teeth he saws down trees; with his forefeet he digs holes and prepares clay; and his tail he uses as a wheelbarrow or hod for the conveyance of mortar, and afterwards of a trowel to plaster his house.

The operations of the beaver have a considersble resemblance to the works of man; and, to judge from the first impression they are apt to make, they might be regarded as the result of reflection. In their actions these animals are governed by instinct, not by reason, as a closer examination of their labours amply demonstrates: reason teaches its possessors to improve on the labours of their predecessors; instinct dictates the same species of labour with the same materials, in the same season, and in similar situations. In this respect the Author of nature has distinguished between rational and irrational animals; and the beaver is inferior to none of the insentient part of creation, though far superior in instinct to the sheep. But what divine wisdom is manifested in the gradations of instinct conferred on animals! May we be excited by the knowledge we possess of animals to admire the wisdom and goodness of our common Creator!

AUGUST 13.

THE NUTRITION OF THE HUMAN BODY.

ALIMENTARY substances are composed of two different kinds of particles—those which remain in the body for its nourishment, and such as must be expelled. For both these ends, the food must be divided into small parts and dissolved; and the first part of this operation is performed by the mouth, the second by the stomach: the foreteeth or incisors cut it in pieces, which are torn by the canine or eyeteeth, and ground small by the double teeth; the tongue and lips likewise assist to keep the aliments between the teeth as long as is necessary. By the pressure of certain glands in mastication, the saliva is conveyed to the food in the mouth, in order to soften it and facilitate digestion: hence it is of considerable consequence that food should be sufficiently chewed before it is swallowed.

The food, thus comminated and in some sort dissolved, passes out of the mouth into the throat, which is likewise kept continually lubricated by the secretions from the glands: when it is too dry, the sensation of thirst intimates the necessity of drinking. After passing through the gullet the food is received into the stomach, in which is a secreted fluid called the gastric juice, by whose action the process of digestion is effected: when the stomach has been too long empty, the gastric juice, stimulating its nervous coat, produces the sensation which we call hunger. The stomach is in continual motion, so that sometimes it is longer or broader than at others: the aliment, however, is prevented from returning into the gullet by a valve placed at the upper orifice of the stomach, which closes when the half digested food is propelled upwards; so that it is obliged to pass through the pylorus into the intestines.

The intestines might be termed a prolongation of the stomach. This canal is subject to a constant motion, called the peristaltic motion, by which the whole alimentary mass is completely agitated: reduced to a pulp, it remains a considerable time in the intestines, and passes through them very slowly. Here a new fluid, called the bile, is conveyed to it by a particular duct: it flows from the gall bladder, and is prepared in the liver, and perhaps, also, with the aid of the spleen, and contributes to the further dissolution of the aliments. In each of the intestines are the orifices of extremely delicate vessels, called lacteals. The purest and whitest part of the alimentary substance is continually passing through these vessels, which convey it into a larger tube: in this it is propelled upward to the chest, and discharges itself into the veins, where, by its commixture with the blood and other juices, it exchanges its white colour for red.

After the separation of the chyle, nothing but the excrementitious part is left: this passes from the intestine called the coecum into the rectum, and there accumulates till it produces the action of the organs which occasion its expulsion. The intestines are fastened to the mesentery, and are kept sufficiently extended, so as not to become entangled with each other. All the viscera of the abdomen are enclosed in a pingeous membrane called the peritoneum. As the intestines furnish chyle, so whatever is necessary for the preservation of the body is secreted in the veins and glands: these fluids are conducted by very fine vessels to the place of their destination, and all that is superfluous or pernicious is carried off through other channels. If any thing of an injurious nature has gained admission into the body, an extraordinary movement soon takes place in the system, which is sometimes succeeded by ulcers, copious perspiration, and other evacuations, which may be assisted by medicine for the preservation of health.

You see, Reader, how many operations are necessary for the satisfaction of the daily wants of your body—how many parts and organs must operate in unison, that your body may be nourished and preserved! So intimate is the connexion between the internal and external parts of your body that, by means of it, the digestion of food and the secretion of the various fluids and humours are carried on. The most extraordinary circumstance is, that all the functions which the body performs for the purpose of nutrition tend, at the same time, to several other ends: the tongue contributes to the nourishment of the body, but it is likewise the organ of speech and taste; the organs by which the acid and superfluous humours pass away from the body serve also for the propagation of the species. There is not a member of our body that was not made for more than one use; and this is a striking proof of the infinite wisdom of our Creator. Reflect on this during your repasts, and let it also be sometimes the topic of your conversation: it will afford you a copious and useful subject of investigation, and you will thereby fulfil the injunction of the Apostle:—"Whether ye eat or drink or whatever ye do, do all to the glory of God."

AUGUST 14.

DIFFERENT ASPECTS OF NATURE.

THE works of nature, so superior to those of art, are particularly so in the great and infinite variety they display, from whence we daily and hourly derive fresh subject of astonishment and delight. When we have once or twice examined a work of art we are tired, and look upon it with indifference; but when we examine minutely the productions of nature, we find our pleasure increase every time that we inspect them.

Let us consider nature in one of her most sublime and magnificent forms—let us contemplate the majesty of the heavens, the innumerable host of stars, and the prodigious extent of the ocean—let us make a comparison between them and all that man has constructed of grand or beautiful. How insignificant will the latter appear! The works of the Almighty are of an extent beyond the grasp even of our imagination: to convince us of his infinity he had only to form the heavens; they proclaim his glory, they declare his power. Is there any employment so capable of inspiring us with a profound veneration for God, as the contemplation of his power in the magnitude of his works? With what awe, what religious fear should we not witness those great phenomena of nature which man in vain would strive to imitate, such, for instance, as earthquakes, volcanoes, inundations, storms, and tempests! These great scenes of nature, which rarely yet occasionally appear on the great theatre of the universe, should convince us of the power and majesty of the Creator of the heaven and the earth.

Nature also presents to us scenes of beauty and delight: the enameled plains, the wood-crowned heights, blushing with the purple vine and carpeted with fragrant herbs, these declare his glory: in these he appears as the benefactor of mankind, and this lovely season abounds with the liberal proofs of his omnipotence and love.

Soon, however, will nature change her gay embroidered robe for one of sombre hue; by degrees her beauty will disappear, and, instead of fertile plains, she will present to us a desolate and barren prospect. The visible decrease in the length of our days is a sufficient warning to us to prepare for indoor amusements; but, even under this unpleasing appearance, nature has claims upon our gratitude; for winter, though apparently inactive, is nevertheless busily employed in the preparation of the blossoms of spring and the fruits of summer and autumn.

Let us make a comparison between these changes of nature and those of our life. The latter is subject to the same variations, and is constantly changing its appearance; the most pleasing prospects quickly vanish, and are replaced by scenes gloomy and appalling: yet let the pious Christian prepare in prosperity for the hours of adversity, and bless the God of nature at all times, in the summer sunshine and also in the wintry storm.

AUGUST 15.

DAMAGES WHICH MAY ARISE FROM EXCESSIVE RAIN.

MODERATE rain contributes to the fecundity and growth of plants, and consequently it is of inestimable benefit to the earth; but it becomes particularly injurious to the vegetable kingdom when it falls to excess: if too violent, it buries delicate plants beneath the soil; and if too lasting it deprives them of all strength of growth: excessive humidity deprives them also of heat; the circulation of the sap becomes languid, the secretions are interrupted, the plant fades and frequently dies.

Yet these are not the most prejudicial effects of violent rains: they sometimes produce the greatest mischief. When several clouds, impelled by violent winds, meet together, and their course is impeded by towers or mountains, they suddenly burst and deluge the country round: the most melancholy effects naturally follow; for water not being compressible, it must naturally effect its escape whenever it is violently compressed; and hence, in the above cases, it precipitates itself in one mass with the greatest violence from rocks and mountains or lofty buildings: it is therefore not at all surprising to find it carrying with it huge masses of rock, and overturning towers and trees. Two causes concur in rendering this effect more violent: the first is the great quantity of water which is precipitated; the second the vast velocity of its fall, increased by the height from which it precipitates itself, the action of a body which moves being always in proportion to its weight and velocity.

Waterspouts are still more formidable: their figure resembles the form of an inverted cone, the broad point terminating as it were in the clouds. These waterspouts carry away every thing which they meet with, even lifting bodies from the ground, which, when the spout bursts, are precipitated with the water. If the point of the pyramid touch the sea the water seems to boil, so violently is it agitated; and sometimes it will rise to a great height: but if the waterspout bursts upon buildings it will overthrow them, and if it comes in contact with a vessel at sea it will frequently sink it.

The cause of waterspouts has been lately attributed to electricity; and the following are the reasons from which Beccaria, a celebrated philosopher, makes his deduction:—

Waterspouts appear generally in calm weather, yet in months peculiarly subject to thunderstorms; and they are commonly preceded or followed, and sometimes accompanied by lightning, hail, or rain. Whitish or yellowish flashes of light have occasionally been seen, moving with prodigious swiftness about them. And, lastly, the manner in which they terminate exactly resembles what might be expected from the prolongation of an electrified cloud towards the sea: the water and the cloud mutually attract each other; they suddenly contract themselves, and disperse almost at once, the cloud rising, and the water of the sea under it falling to its level.

But the most remarkable circumstance, and the most favourable to the supposition of their depending upon electricity is that they have been dispersed by presenting to them sharp-pointed knives or swords: this is, at least, the practice of mariners in many parts of the world where these waterspouts abound.

Waterspouts are not often seen on land; but mountainous countries are much subject to the bursting of clouds.

Whenever a country is afflicted with these destructive phenomena, we are inclined to murmur at the judgments of God, without at all reflecting on the numerous blessings and the abundant goodness which Providence so constantly and so profusely sheds on every part of the globe: we are tremblingly alive to the afflictions of life, but are insensible to the general good we enjoy. Ah! let us avoid such gross, such unpardonable ingratitude. Let us rather, with humility and admiration, consider the works of God, and endeavour to form more just and suitable conclusions of the wisdom of his government: this will be the result of our serious meditations upon the wonders of nature, provided that, with an attentive mind and a religious heart, we pursue our inquiries upon this interesting subject.

AUGUST 16.

CARE OF ANIMALS FOR THEIR YOUNG.

ONE of the most remarkable instincts with which animals are endowed is that which induces them to show such care and attention to their young. No animal totally abandons its little ones; their self-love extends, on the contrary, to their posterity, and that in the most industrious and suitable manner, agreeably to their mode of life. Some of these little creatures, which proceed from the eggs of fishes and insects, have no occasion to be sat upon, because the temperature and heat of summer are sufficient to animate and strengthen them, and because, from the moment of their birth, they are able to provide for themselves, if they are placed where their food is to be found: the greater part of insects do not even live to see their posterity. Fishes and amphibious animals cannot distinguish their little ones from others of the same species, and yet nature has taught them to provide for their preservation: fishes come in crowds to deposit their eggs near the shores of rivers, where the water, being shallow, is more exposed to the sun's rays; amphibious animals deposit their eggs in the sand, as if they knew that the young ones, when hatched, would instinctively repair to their native element. Gnats and many other insects, which first receive life in the water, deposit their eggs in that element, although themselves have become tenants of the air or the earth. Those insects which require but little food in the last stage of their existence do not fail to lay their eggs where their young ones will find an ample store of provisions when first hatched, either in fruits, plants, flesh, or other substances which form their habitual food: some will even place proper food in the cells they have chosen as the receptacles of their young.

Other animals, which cannot provide for themselves, are intrusted to the care of their parents. What solicitude do birds display, even before they have laid their eggs! Every species has its particular mode of constructing a nest. With what assiduity, with what patience do they not sit upon their eggs during several succeeding weeks, scarcely finding time to eat! How carefully they exclude all cold from their nestlings! How they toil to provide them with subsistence! And what courage do they not evince in the defence of their young! With what tenderness, what attention do quadrupeds suckle their progeny, and watch over them to shield them from harm!

In general, the instinct of all animals for the preservation of their young is more powerful than the gratification of their own wants: they will suffer hunger and thirst, they will refuse sleep, and deprive themselves of every comfort; nay, they will expose their lives rather than forsake their little ones. How wonderful, how admirable, how inexplicable is instinct! For the preservation of the whole species depends upon the care of the parent, whether bird or beast. I am not surprised that viviparous animals should evince affection for their young; but that oviparous animals should display such care and anxiety respecting their eggs is truly astonishing: the eggs are so differently shaped to their parent; neither do they, in fact, resemble any thing animal; nay, more, the eggs are not even laid when the bird first commences to build its nest, or the insect to seek for a convenient spot to deposit its minute eggs.

Oh, thou Creator of all things! who is there that is not overwhelmed with astonishment at contemplating thy wisdom and goodness? Who is there who can meditate upon thy care for the preservation of the animal world, and not be confounded by his reflections? Open thou our eyes, O Lord! that we may see and duly acknowledge the supernal wisdom which shines throughout all thy works.

AUGUST 17.

DIVERS KINDS OF EXTRAORDINARY RAIN.

EVERY phenomenon of nature, whatever its description may be, becomes the object of terror to ignorant and superstitious persons: we have proof of this in those rains which superstition looks upon as supernatural, and which terrify so many persons.

Who is there that does not tremble at the bare mention of a shower of blood? Sometimes, and particularly in summer, rain has fallen of a reddish hue, to which the above appalling name has been given: when, after a fall of ordinary rain, the surface of the water appears red, or that, in the country, drops have been discovered of that colour, the fearful report spreads on every side. Popular opinion supposes this rain to have fallen from the clouds, and that it is really blood. This opinion once allowed, a supernatural cause must be given as its origin: nothing, however, can be more natural; for, the atmosphere being charged with different substances, and with a multiplicity of foreign bodies, we should not be surprised that the rain should partake of their quality and colour. The wind may carry away and disperse the coloured farina of a variety of flowers, and even the red excrements of certain caterpillars: there are even small diminutive red insects, which lie on the surface of waters, and which credulous people may mistake for blood.

Equally improbable is the sulphureous rain which is sometimes said to fall. This rain is not impregnated with that mineral, although it is possible that a few particles of sulphur may mix with the clouds; but this extraordinary phenomenon is, in fact, nothing more than common rain, impregnated with the yellow farina of flowers, or the minute particles of sand which the wind brings from foreign countries, and which are precipitated with the rain.

The pretended showers of wheat arise from as simple a cause: when a hard rain falls where the plant celadine is plentiful, the roots are soon exposed, and the small bulbs forming a part of them being detached, they are mistaken for wheat, and the poor people predict famine from this natural consequence of so natural a cause.

I shall mention one more example upon this subject: the rains which fall in Philadelphia during the month of August sweep away a multitude of insects, which, falling upon the skins of the inhabitants, if not taken quickly off produce a violent itching; and when they fall upon stuffs they multiply and destroy them like common moths.

We are not always sufficiently sensible of the obligation we are under to naturalists for their researches and discoveries, which tend greatly to extirpate many superstitious opinions. We must, however, confess that ignorant people still retain many of their prejudices; and this shows that man is more inclined to error than truth, and that he is by no means so convinced of the wisdom and justice of God as he should be.

Let us not dishonour our reason and the Almighty himself by such foolish prejudices. Let it, on the contrary, be to us a source of joy and consolation that the benevolent Creator of the universe has ordered every thing in nature so as to produce the most judicious ends. Let pagans and superstitious persons of every religion retain their credulity upon this subject; but let us, who know the true God, glorify him by our faith, honour him by our confidence, and endeavour more and more to diffuse reason, piety, and wisdom among the children of men.

AUGUST 18.

SENSIBILITY OF PLANTS.

WE observe in plants certain movements, which do not permit us to decide whether they have or have not sensibility. There are vegetables which shrink from the touch: others are observed to open and shut their flowers at stated periods of the day, and this with so much certainty that the hour may be ascertained by attending to them: others, again, completely fold up their leaves during the night; and these periodical actions take place, whether the plant is exposed to the open air or whether it is shut up in an apartment. The movements of a marshy plant called diomea muscipula, which has been discovered in Carolina, are exceedingly curious: its round leaves are furnished with a number of prickles, which are extremely irritable; so that, when an insect ventures to touch the upper part of the leaf, the two extreme edges fold together, and hold the insect fast until it is dead, and then the leaf opens of its own accord. Besides, a slight degree of observation is sufficient to disclose to us in some of our most common flowers certain peculiarities: the tulip, for instance, unfolds its silken leaves when it is fine, and closes them when it rains or the sun disappears; pod-fruits, such as peas and beans, open and roll themselves like dried weeds when they are ripe; wild oats, when put upon a table, will move of themselves, particularly if they have been previously rubbed in the hand; the heliotrope and divers other plants always turn towards the sun.

These examples are within the reach of most of us; and from such as these it has been partially admitted that plants may have sensation; but plants display no other mark of sensibility; every thing appears mechanical in their operations: we cultivate a plant, we bring it up, and we destroy it without discovering any thing analogous to what we observe in an animal under the same circumstances: we see a plant shoot, grow, flourish, and put forth seeds; and we look upon its operations as we do the mechanism of the hand of a clock, which moves round unconsciously to all the points of the compass; the most minute investigation of the economy of a plant does not discover to us any organ which authorizes us to pronounce it the seat of animal life. When we oppose these two observations with those above stated, which refer to the sensibility of plants, we are at a loss to draw our conclusions. Perhaps all that we observe in plants which indicates sensation arises merely from the structure of certain fibres, which sometimes contract and sometimes extend; perhaps the subtile exhalations from our bodies, coming in contact with those delicate plants, may induce them to shrink from our touch: but, again, it is possible that this apparent sensibility may form a link in the chain of nature, and ally the vegetable kingdom to the animal world. How short the distance between the plant and the muscle!

Thus you see, my dear Reader, that conjecture is all that can really be offered upon this interesting subject: we can neither affirm nor positively deny sensation in plants. Let us not, therefore, presume to decide, but rest satisfied that it is not important to our peace nor our happiness that this question should be conclusively answered: we have ample subject for contemplation and gratification in the book of nature, if we do but make a proper use of the knowledge we possess. Such speculations as the above are more curious than useful: let us therefore rest satisfied with the intelligence we have received, nor be ambitious to penetrate mysteries which will perhaps never be unraveled but in the regions of eternity.

AUGUST 19.

THE FEAR ARISING FROM STORMS.

At this season of the year, when nature presents only smiling and agreeable prospects, calculated to inspire contentment and joy, there are some people who nevertheless find subject for murmurs and complaints:—"Summer," say they, "would indeed be a delicious season, were it not for the storms which interrupt its serenity." The fear of storms and tempests arises from an opinion that they are indications of the wrath of Heaven, and the ministers of its vengeance; but, if we reflect upon their utility in purifying the air from a multitude of exhalations and noxious vapours, we should soon entertain very different opinions, and look upon them as benefits more proper to inspire gratitude than terror.

But can we deny that thunder sometimes causes great mischief? How many men and animals have fallen victims to the effects of a thunder storm; whole towns and villages have been desolated by these phenomena. To these observations I reply, that our terrors greatly magnify the evil as well as the danger. But in order to point out the little danger which is to be apprehended from thunder, it is sufficient to mention that, out of seven hundred and fifty thousand persons who died in London during the space of thirty years, two only were killed by lightning. And we may also remark that during a thunderstorm most people prolong their fears to an unseasonable length. He who has time to express his fears, and to point out the possible effects of the lightning,, is already out of danger; for the flash being gone, the thunder will have no more power over us than the noise from a cannon ball. The thunder announces to us that the danger is passed, and it also informs us of the distance of the storm.

The surest means of preserving ourselves from the fear of thunder and other alarming phenomena is to endeavour to preserve a good conscience. The just, the tranquil, and the firm fear not the judgments of Heaven. All nature is armed against the sinner. But when the supreme Judge speaks terror to the guilty heart, the good man knows he is always under the care of the Most High. He hears the thunder roll with unblanched cheek. His Creator, the God whom he loves, is the lord of the thunder. He knows when he threatens only, and when he means to strike. The God of heaven sports with tempests and with storms; he makes use of them to convince the impious of his existence, and to strike the wicked with dismay. Tremble not, ye beloved of the Almighty. In the midst of the thunder ye may look up to him. A day will come when ye shall be raised above the thunder, and walk in peace and composure upon the clouds illumined by the lightning's glare. Then will ye thoroughly understand the beneficial effects of thunderstorms, and you will bless that Great Being who can render this formidable effort of nature subservient to the good of mankind. With one hand he lances the thunderbolt, with the other he sheds refreshing rains; showing himself alternately in the characters of Judge and Father.

AUGUST 20.

SUMMER FURNISHES US WITH THE IMAGE OF DEATH.

A SHORT time ago, when I wandered through the gardens, I was surrounded by smiling and beautiful objects, and every thing capable of exciting feelings of joy and delight. But now the prospects around me gradually fade, and become more dull and uniform. Those beautiful flowers, which so lately embellished our gardens, have disappeared, and have left only a few behind them to recall, as it were, the memory of those that are gone. These revolutions of nature convey an instructive moral. The first period of our life is aptly personified with the beauties of spring; we ourselves are then elate with hope, and our friends with expectations. But how often are both disappointed! for the flower fades before it is noon, and the blossom sometimes falls before it unfolds. A sudden, or even a lingering illness, deprives us of all our charms, and the scythe of death mows down all our hopes.

I observe that the flowers of spring, which live till summer, soon perish. This is a striking image of death. Scarcely a day passes but we hear of some one cut off in the prime of his days by unexpected death. God has many means to terminate our days. It is true that we are in part insensible to the sudden deaths of our fellow citizens; but it is not less true that the days of man are few and full of sorrow.

At this season of the year we quit the open plains to avoid the scorching heat of the sun, and seek a refuge from his beams amid the tall trees of the forest. And are not these retreats well calculated to remind us of the silence and darkness of the tomb? In that earthy bed we shall find repose, after having sustained the heat and burthen of life.

The reaper is preparing to cut down the corn. On either side the tall grain falls beneath the sharp edge of his sickle, leaving a barren looking field as he proceeds in his labour. In this I behold the image of man's destiny. All flesh is grass, and the glory and length of human life is like the flower of the field. Man flourishes for a time till the Lord of the harvest gives the word of command, and he then falls beneath the unsparing scythe of death.

This is a lesson I may learn from the smallest bee. When I consider the activity and diligence of these little animals, in collecting honey and laying up their winter store. I learn from them to heap up treasures of good works and piety against that hour of need when every thing else shall fail me.

Soon will the labourers assemble, and convey with songs of joy the treasures of the falling year to their winter storehouses. The days of harvest are the most important and the most solemn of all the year. But, O my God, how much more solemn will be that day, when the Creator of the universe shall commence the harvest of the world; when he shall say to his angels, " Root up the tares, and bind them, and cast them into the fire, but gather my wheat into my garners." With what joy shall we not contemplate this great day if we do well! Here we go on our way weeping, sowing our seed, but a day will come when with the song of triumph we shall appear bringing with us the fruits of our harvest.

These are not the only, but they are the most striking images of death which nature presents. Every man must look upon them as pictures of the shortness and fragility of our nature. Neither will these reflections any ways damp the joys we experience in summer. A meditation upon death is calculated to embellish the pleasures of this interesting season, and to render it more agreeable than it generally proves to the greater part of mankind. So soon as we consider death in its proper light, far from regarding it as the enemy of our pleasures, we shall find that it ennobles them. Should we yield to any excess during the fine days of summer, if the thoughts of death were present to our mind? Should we abuse God's gifts if we remembered that we must give an account of our administration of them? The goods of this world would not wholly engross our thoughts, if we reflected that the fashion of this world passeth away. The burthen we bear during the heat of the day would appear lighter if we could recall to our minds the quiet and repose of the tomb. The vanity and emptiness of the pleasures of this world will be evident to us if we would compare them with those promised to all who by good deeds seek for glory, and honour, and immortality in the world to come.

AUGUST 21.

CAUSES OF THE HEAT OF THE WEATHER.

One of the principal causes of the heat of our globe is derived undoubtedly from the sun and his relative position to certain parts of the earth. When the sun is on the southern part of the globe, the days in the north are not so warm as when he approaches the opposite pole. The same effect may be observed in the southern parts when the sun approaches the north pole. In those countries where the position of the sun is nearly vertical during the greater part of the year, the cold is never so intense as to freeze the ponds, rivers, lakes, &c.; on the contrary, the heat is there always excessive; the natural result of the constant action of his rays upon the same place. And hence it is that towards the poles, where the days are very long, the same effect is often produced. These reflections induce us to conclude that the sun and its relative position to the earth are the causes of heat in the open air.

But there must be other causes which produce heat, or else every summer would be alike hot, and every country situated under the same parallel of latitude would enjoy an equal proportion of warmth: neither of which is really the case; for on the tops of the highest mountains it is much colder than in the valleys which extend at their feet. Even in the torrid zone, if we quit the plains, where the heat is suffocating, and ascend a mountain two thousand toises above the level of the sea, we shall find ourselves exposed to the most piercing cold, and surrounded by snow and ice. It has also been observed that, during winter, when the cold has been intense in the day, that towards midnight the weather has become more temperate, although the rays of the sun have then no part in producing this change of temperature. This then is an incontestable proof that the air in itself contains certain particles of innate heat.

There are bodies which by friction take fire. The axletree of a carriage wheel will take fire when the vehicle goes with great rapidity, unless it is carefully greased. Some substances inflame and kindle when mixed with others. Water poured upon straw or hay will produce a considerable degree of heat. Certain bodies, when they undergo a state of putrefaction, acquire a great accession of heat, which is perceptible even to the touch. The circulation and decomposition of different particles in the air will also produce caloric or heat.

Heat in the open air may then be produced, first, by the sun as its prime cause; to this we may add heat derived from various animal substances; from fire kindled in woods; from the ignition of coal and other combustible matter; from minerals; and the profound abysses of the earth and the ocean, &c.

These effects and arrangements, O my God, are worthy of thy wisdom and goodness. They extend to all parts of the world; and to every climate thou hast assigned a portion of happiness and comfort. But we who inhabit one of the temperate zones, we are more sensibly affected by thy paternal care. Heat and cold are to us distributed in the wisest proportion; and we should be the most ungrateful of men if we did not acknowledge and celebrate thy goodness.

AUGUST 22.

VARIETY OF PLANTS.

One of the most remarkable characters of the vegetable kingdom consists in the great variety of plants. They are diversified in their form, propagation, properties, and virtues.

The manner in which the fructification takes place in some plants is still very obscure. That of the moss and fungus tribes have totally escaped all human researches. Some flowers have no corollæ; from the middle of others additional flowers seem to proceed. And as I had occasion to observe before, some unfold their blossoms, and turn to the sun; close when he disappears, and others contract and shrink when touched. Trees blossom, bear fruit, and lose their leaves, some earlier, some later than others. They are all indigenous to some particular country, and consequently require different treatment.

The industry of man has however naturalized all the most useful races of the vegetable kind, and brought them to considerable perfection. The varied form of plants is one of the most fascinating of their properties. If we compare one kind with another, or even different plants of the same species, we shall be astonished at the variety of forms we behold. Let us glance from the truffle to the sensitive plant; from the mushroom to the carnation; from the toadstool to the lilac; from the morel to the oak; from the misletoe to the orange tree; from the ivy to the pine. What opposite perfections do these all display! The fungi present an inexhaustible fund of astonishment and delight. So curiously are they formed, they can scarcely be classed as plants. If we then direct our attention to the grass tribes, we rise with wonder from the contemplation of a single blade of grass to the full grown wheat bending under the weight of those treasures which constitute the chief support of man. And what gradations between the slender bind weed and the fruitful vine!

The works of nature claim our attention not only from their variety, but their harmony. All plants, from the hyssop which grows on the wall to the cedar of Lebanon, possess the same essential parts. The smallest herb is as complete a plant as the most superb rose tree; and the latter is in this respect no ways inferior to the full grown oak. All plants belong to the same kingdom; all follow the same general laws of propagation and multiplication; yet every species is distinct. Of the many thousands of plants which have been discovered, each has its own peculiarities. What inexhaustible riches do we not discover in their forms, colours, and proportions!

I look upon it as a great happiness that I am capable of distinguishing these varieties, and of appreciating the numerous beauties of the vegetable world. A mind once capable of receiving enjoyment in the study of nature is always anxious to return to it with the first opportunity which presents itself. My soul, ravished by this delightful occupation, rises from this view of nature to nature's God.

O Thou, whose power and wisdom have so displayed themselves in the wonderful and beautiful arrangement of the vegetable kingdom. I bless thee, I praise thee, I laud thee. How could I neglect this pleasing duty when all nature cries aloud around me, proclaiming the bounty of the Most High. And if, O my Creator, I were guilty of this ingratitude, how could I hope for thy approbation or thy love?

AUGUST 23.

REFLECTIONS UPON THE ANIMAL KINGDOM.

We may consider the animal world as a well ordered kingdom, consisting of a number of inhabitants, each occupying a sphere suitable to its qualifications: they are all endowed with faculties to acquit themselves of their several duties; and sufficient to protect them against the attacks of their enemies. In this republic of animals, the small and the weak, which are the most numerous part of the community, are subservient to the more powerful; but all are alike subject to man as the image of his Creator. Animals of every description find every where an ample subsistence; they are every where dispersed, and their nature, temperament, and organs are suited to their different pursuits and modes of life.

Their occupations are very different, but they tend to the preservation of each species, to support the equilibrium between the animal and vegetable kingdom, and to their self-preservation. Instinct with them supplies the place of reason, and most wonderful are its effects. Instinct instructs them to gratify all their own wants, to seize their prey, to build their nests, to store up provisions, prepare for their metamorphoses, to defend themselves, &c.

Some animals are carnivorous, and prey upon the superabundance of other animals. Each has its particular enemy, and hence it is that the equilibrium of nature is preserved. Sick animals, or those which have any natural defect, are generally the first to fall a prey to the rapacity of others; decayed fruits and other vegetable substances are soon devoured; the earth is therefore disencumbered of them, the air preserved from infection, and nature retains her lustre, freshness, and beauty.

Beasts of prey are endowed with strength, agility, and dexterity. But lest they should destroy whole species of animals, they are confined within certain limits: they also increase in much smaller proportion, and frequently prey upon each other. Some animals sleep during the winter, digest with difficulty, and nourish themselves with fruits when pasture fails them. Animals of a weaker cast are furnished with various means of defence against the attacks of their enemies. Some are fortified in armour, others are endowed with peculiar swiftness, or make their habitations in inaccessible places.

Animals are in some sort compelled to fulfil their several functions, because their happiness depends upon this circumstance. The instant they depart from the prescribed laws of nature, that instant they would suffer from the deviation. The mammalia class is the largest in size, and the least numerous; they fulfil most important functions. Some birds feed upon grain, others upon carcasses and insects. The greater part of amphibious animals are animals of prey. The smallest animals are the most numerous and the most voracious; they are the means through which fructification in many plants is effected, and are otherwise very useful.

An examination of the animal kingdom must convince us of the existence of a Being who possesses inexhaustible treasures of wisdom and intelligence. Who but such a being could have peopled the wide world with such a variety of creatures, and furnished them with food and habitations? provided them with such wonderful instincts, and held the balance between so many kinds, so that each shall be preserved? What but omnipotence could have formed the bones, muscles, skins, joints, and internal parts of such creatures as are best suited to their several necessities?

Yes, Lord God Almighty, to thee alone must be attributed the power, the wisdom to perform all these things, and to thee alone belong glory, and honour, and power.

AUGUST 24.

DIVISION OF THE EARTH.

All the countries of the known world are divided into four principal parts:—Europe, Asia, Africa, and America.

Of these Europe is the smallest, for it is only three thousand three hundred miles long, and two thousand three hundred miles broad. Yet its inhabitants possess large parts in the other continents, and they have subdued nearly the half of the world. The Europeans are the only people who travel to all parts of the world, to acquire the various productions common to each; and they are of nations the best informed, and cultivate the arts and sciences with unremitting industry and success. Europe is the only part of the world which is generally covered with towns and villages; the only one where man entertains a social and regular commerce with his fellow creatures, and professes, with slight variation of forms, the same religion. The three other portions are inhabited by a multitude of different nations, who have no connections with each other, who know but little, and who differ greatly in manners, laws, and religion. In saying this I must be understood to mean the aboriginal inhabitants of those countries.

Asia is the largest known continent. It is seven thousand five hundred miles long, and five thousand two hundred and fifty miles broad. As the interior countries of Asia do not enjoy the refreshing air from the sea, as they are not watered by rivers, and as they consist chiefly of vast plains and barren mountains, the heat and cold is there excessive, the earth is unfruitful, and has consequently never been well cultivated. Even to this day these countries are inhabited by people who erect their dwellings in the morning, and sojourn for a day, then strike their tents, and seek fresh plains and other pastures. These wandering tribes have frequently committed great devastations upon the more social people of Asia. The northern parts of this extensive continent have never been regularly inhabited; they consist principally of lakes, marshes, and fens. But the southern, eastern, and western countries are the most fruitful in the world, particularly the former. These are astonishingly fertile, and produce every thing necessary for the convenience and comfort of life.

Africa is the next in size to Asia, since it is four thousand two hundred miles in length. It is situated within the torrid zone, and consists chiefly of extensive sandy deserts, mountains of a prodigious height, forests, and ferocious beasts of every description. The extreme heat enervates and weakens the faculties of the soul. The nations which compose it are consequently ill governed. The interior of Africa is but little known, although it is nigh to Europe.

America has only been discovered a few centuries ago. It is divided into two continents, separated by a very narrow isthmus, and surrounded by a number of islands. Within these last fifty years great discoveries have been made on this vast continent, and new governments and kingdoms have been formed. Its natural aspect presents the most varied features, as it extends from the north pole to the fifty-sixth degree of south latitude. Immense chains of lofty mountains, extensive marshes, and rivers, whose waters roll thousands of miles through vast savannahs, rushing with frightful impetuosity down rocks and precipices, till the eye grows giddy with gazing, and the ear is stunned with the thunder of their noise. It abounds with reptiles, serpents, and insects. Every thing in America is upon a most extensive scale.

If we calculate the number of leagues these four great continents occupy, their size will appear very considerable; and yet all the known parts of the world occupy but one fourth part of the globe. But what is our earth when compared to those immense bodies which the Almighty has placed in the firmament? It is lost amidst the innumerable host of stars, as a grain of sand is lost when compared to a mountain. Yet to us, whose vision is so bounded, the world is a superb theatre of observation. And as we know but little of the worlds which roll over our head, let us apply the knowledge of our own to the glory of the great Creator and our own edification.

AUGUST 25.

OF THE NATURE AND PROPERTIES OF LIGHT.

WE are at all times sensible of the utility of that light which is so bountifully bestowed upon us, yet we have never been able to ascertain its nature. All that the greatest philosophers have said upon this subject amounts but to conjecture. Perhaps light is only a fluid substance with which we are surrounded, and which to be seen requires only to be shaken and put in motion by the sun and other inflammatory substances. Or perhaps it may be fire itself, which by an emanation of its infinitely subtile parts softly strikes upon our eyes at a certain distance. This hypothesis is adopted by many celebrated philosophers; yet it is very certain that there is a considerable difference between light and fire. The former is infinitely more subtile than the latter; it traverses in less than a moment glass and other diaphanous substances, fire on the contrary penetrates them but slowly. The pores of glass are therefore large enough to permit the particles of light to pass freely, while fire, being less rare, meets with more resistance. It is also remarkable that fire moves more slowly than light. For example, if we put lighted coals into a chamber, the warmth spreads slowly, and the air becomes very gradually heated. But if we bring a lighted candle into a dark apartment, it is instantaneously filled with light. These facts have led to the conclusion that light and heat are not precisely the same substances, although they have a great affinity, and in many instances the one occasions the other. But perhaps we are drawing false conclusions from this reasoning.

The properties and effects of light are not less incomprehensible than its nature. The rapidity with which it spreads is prodigious. If its celerity were not greater than that of sound, seventeen years would be necessary for the passage of one ray of light from the sun to us; but seven or eight seconds are the utmost period which now elapse while this transmission takes place.

In this short space of time a ray of the sun traverses many millions of leagues, and more than twenty thousand in a second. Now as sound travels at the rate of a thousand and seventy feet in a second only, a globule of light must necessarily be five hundred and ninety thousand times more subtile than a particle of air, although the latter is invisible not only to the naked eye, but is not to be discerned by the most powerful microscope. Astronomers have ascertained that the rays of a fixed star must, before it reaches us, traverse a space which a cannon ball could not penetrate in less than one hundred and four thousand millions of years. The extension and propagation of light is not less inconceivable. The space through which it spreads itself has no other limits than that of the universe, and its immensity is so great as to surpass the comprehension of all human understanding. This boundless extent enables us to discern the most distant objects; and if we could construct glasses which would extend our sight as far as light extends, we should then behold the extremities of the universe.

But our understanding is too limited to penetrate the views of the Almighty with regard to the nature and properties of light; yet it is not less true that we could explain many of the phenomena of nature if we properly directed our attention to them.

For instance, whence is it that light should spread itself with such astonishing velocity? The answer is evident. In order that a great number of objects may be seen at the same time by different persons. If the propagation of the rays of light were slower, great inconveniences would arise upon the earth, and the force and brilliancy of light would be exceedingly weakened; it would be less penetrating, and darkness would disperse but tardily. Why is it that the particles of light are so infinitely minute, unless it is to paint every object upon the smallest eyes? Why do not the rays possess a greater density? Why are they so subtile, but that they may not strike upon our eyes with too much brilliancy, nor wound them by their heat? Why are they refracted in so many ways, if not to assist us in distinguishing those objects which pass before our eyes?

Pleasure and utility are always united in God's plans. Oh, what gratitude do we not owe the Father of light for these wise, these benevolent arrangements. Without light our lives would not only be enveloped in gloom, but soon would be drawn to a close.

AUGUST 26.

STRUCTURE OF BIRDS.

Birds may be ranked amongst the most beautiful of the animal creation. The structure of their bodies, even in the most minute parts, is so regular and so perfect that it is sufficient to convince us of the wisdom, goodness, and power of the Almighty. They have bones as well as animals belonging to the mammalia class, but they are very differently clothed. Their body is covered with feathers, laying the one upon the other in regular order, and furnished at the roots with warm and soft down. The larger feathers are covered with smaller ones, both above and below. Every feather is composed of the quill and the beard: the quill is hollow, and through it the feather receives its nourishment: towards the end it is filled with a kind of marrow. The beard consists of a row of thin fibres closely arranged together on either side of the quill. Birds, instead of four, have only two legs and two wings. Eleven bones compose the latter, in the muscles of which are inserted the feathers destined to assist them in their flight. These feathers are turned backward, forming a kind of vault which is strengthened by two rows of smaller feathers covering the roots of the larger. The mechanism of the wings is truly admirable. They do not strike backwards like the fins of fishes, but perpendicularly against the air which is beneath them; and this arrangement greatly facilitates their flight. The wings are also a little hollow, in order that they may retain the air; and yet they are so close that it cannot penetrate them. The body is suspended immediately between the two wings. The head of birds is generally small, so that its weight does not impede the vibration of the wings, besides which its form is calculated to assist in cleaving the air. The principal use of the tail is not to act as a rudder, but to maintain an equilibrium as the birds fly, and to assist them to ascend and descend. The legs are so situated as to support the centre of gravity: the legs of aquatic birds are placed more behind to assist them in swimming. The thigh, the leg, and the toes compose this useful member. The thighs are covered with muscles, and generally feathers. The legs are thin and bare. The foot is composed of four toes, three before and one behind. At the end of the toes are the claws, which enable the birds to seize their prey, or perch themselves firmly on twigs, &c. Some birds are carnivorous, others granivorous. The latter retain the seeds in their crop until they are softened, from whence they pass into the stomach. Their powers of digestion are very great. Birds of prey have much weaker stomachs than those of the former class.

We must indeed be blind or deprived of reason not to acknowledge the traces of divine wisdom in this structure of birds. Their bodies are perfect in all their parts, and well calculated to perform their several offices. The stork and the heron have long beaks to enable them to get at their food in lakes and marshes; their legs too are very long, that they may freely walk in the water without wetting their feathers. The vulture and the eagle are provided with long feathers, strong talons, and sharp beaks, to enable them to pursue and hold their prey. Swallows' beaks are very sharp, and they open wide, that they may catch insects as they fly. The swan has in the windpipe a peculiar reservoir for containing air, through which he can breathe when his head and neck are under water, while he seeks for his food. Several little birds, which live much among thickets and brushwood, have a membrane, which they can draw over their eyes, to protect them from injury. In a word, every species of birds is perfect, every limb, every muscle, every organ is so constructed as best to suit their intended purpose.

In this arrangement of the feathered tribe, we are not only struck by the wisdom of the Almighty, but confirmed by his goodness. Not only is every part useful, but exceedingly beautiful. And what a variety of talent do they possess! What a difference between the sparrow and the swallow; the partridge and the vulture; the wren and the ostrich; the owl and the peacock; the crow and the pheasant! All these birds are perfect in their kind, but how opposite their form! how different their song!

This slight view of the perfections of birds may be of use to you, my dear reader, if you direct your thoughts at the same time to the contemplation of their great Creator. Happy would it be if we daily made this use of his creatures.

AUGUST 27.

REFLECTIONS UPON THE HEAVENS.

We have only to direct our eyes to heaven to be overwhelmed with admiration at this magnificent work of the Almighty. How lovely is that sapphire vault, that superb canopy, and most at night, when decked with twinkling gems, almost eclipsed by the moon's soft beams. Who can behold this lovely spectacle, and not yield to sweet and soft emotions! But how do our wonder and delight increase, if, wrapped in holy meditation, we contemplate it with the mind's eye! What are the limits of this star-clad vault? —where do they begin?—where terminate? Numberless prodigious spheres roll over our heads at different distances, till they vanish like the smallest specks, and the human mind in vain attempts to follow them in their rapid course. A thin ethereal air fills this space, and supports these enormous masses in their orbits. The immense arch of heaven is not supported by pillars nor columns, it is not suspended, it is not attached to any other object,—yet during thousands of years it has, and still preserves its form and nature.

How numerous, how vast are those heavenly bodies which float through the boundless ether! The magnitude of the sun and planets far surpasses that of our earth. And who shall say that among the fixed stars none are found that may exceed even these in size? Their prodigious distance gives them the appearance of small twinkling specks, but they are in fact suns whose vast dimensions we cannot measure. In a fine clear night, even without the aid of telescopes, we discover an innumerable quantity of lovely stars. Thousands no doubt escape the power even of the finest instruments, and we may naturally conclude that our solar system forms but a very small part of the heavenly host.

These reflections should naturally excite our admiration. But to an attentive mind the subject presents more astonishing wonders. These vast bodies are in perpetual motion, turning round their own axes, and performing with incredible swiftness vast circular movements in their prescribed orbits. They are each propelled by an involuntary power from their centre; but another power not less mighty retains them within their orbit. Though so many thousands are revolving together, yet one star never comes in contact with nor impedes the progress of another. During many thousands of years they have risen above or sunk below the horizon at stated periods, and this with so much precision that astronomers can decide accurately upon their positions and courses.

How unlimited would be our admiration if we could comprehend the system of the whole universe! we, whose knowledge is confined to that of the solar system only!

Who can raise his eye to heaven without being awe-struck, when his thoughts glance to the great Author of this stupendous work? Oh, let us in deep humility prostrate ourselves, and adore and glorify him. And when convinced of the weakness and coldness of our homage, let us look forward to that glorious time when overwhelmed with joy and gratitude we shall pour forth our praises, and join in the chorus of just men made perfect and the angels themselves in heaven.

AUGUST 28.

MORAL REFLECTIONS IN A FIELD OF WHEAT.

THE crop of this field was formerly exposed to great dangers. Impetuous winds howled over it, and frequently the stormy blasts threatened to sweep away its valuable product; yet Providence preserved it. Thus do the tempests of affliction threaten to overwhelm the sons of men. But these tempests are necessary for us; they purify our hearts and root up our evil passions. In the midst of pain, suffering, and misfortunes, our humility, our faith, our piety increase. Like the tender stalk of the wheat, we sometimes bend and sink to the earth, but the helping hand of our Heavenly Father raises and supports us.

As the harvest time advances, the corn ripens very rapidly. The dew, the heat of the sun, the soft rains unite their genial influence in bringing it to maturity. Oh, may we daily become more fit for our heavenly habitation! May every action of our life tend to prepare us for this great end! Whatever may be our situation here,—whether the sun enlightens or the clouds shadow us,—whether our days are mild and serene or dark and gloomy, what does it signify, provided that they increase our piety and fit us for eternity.

It is remarkable that the full eared grain differs much in height from those which are thin and spare. The latter are straight, rise high, and tower over their companions; while the others bend under their own weight. This is precisely the case with two kinds of Christians. The vain and presumptuous, who possess but little true religion, insolently raise themselves above those whose piety is deep and heartfelt. Blinded by presumption, they disdain the real means of salvation. Those on the contrary who are rich in virtues and good works bend humbly like the full grown ear of corn.

In a field of wheat all is not alike good seed. How many tares and weeds are found mixed with the corn. Such is the state of the Christian in this world. He always possesses a mixture of good and bad qualities, and his natural corruption, like the tares, often choke up the soil. A field of wheat not only represents the image of a single Christian, but of the whole church. The impious and the wicked often scatter tares by their bad example, where there should be only good seed. The Great Proprietor of the field permits the tares to remain for awhile. He displays patience and long forbearance, nor will he give full scope to his justice until the day of the harvest—that day of retribution.

See with what impatience the labourers hasten to gather in the fruits of the earth. The sickle cuts down every thing. So death levels all, the great and the little, the just and the unjust.

But what sounds rise from yon golden fields? They are songs of joy at the sight of an abundant harvest! Oh, let them be also songs of homage and thanksgiving to celebrate the bounty of God from whom proceed all these blessings! But what will be our joy in the day of the great harvest! What indescribable delight will be that which will await us in the society of angels! There we shall recall our past labours, our troubles, the dangers we have undergone, and the tempests we have escaped, with sentiments of joy and gratitude, and our voices will rise in loud hosannahs, proclaiming the goodness of God our Father. Oh, let the hope of this day comfort us in the hour of trouble, and support us in the hour of adversity. Let it teach us patiently to await the day of the great harvest.

AUGUST 29.

SHELLS.

SHELL animals, or, as they are called, testaceous animals, are very numerous. Their habitation consists of a calcareous substance, which may be considered as their bones. These shells are univalve, that is to say, composed of one piece, or bivalves and multivalves, composed of two or more pieces. Shells are divided into two great families; the muscle tribe, composed of several pieces, and the snail tribe; the shell of which is univalve and ordinarily spiral. The structure of the former is much more simple than that of the latter. Muscles have neither jaws, horns, nor head: all the parts which have hitherto been discovered in them are the windpipe, mouth, and sometimes a kind of foot.

There is a great difference in the propagation of testaceous animals. Some are divided into sexes, others are hermaphrodites, and in others again no distinction can be discovered. Some are oviparous, others viviparous. They appear however, when first formed, with their shell.

As the animal grows, the shells, which are lined with a thin membrane, increase both in size and thickness. They are formed of a slimy substance exuding from the body of the animal, and which gradually becomes indurated; but whether they increase in size by exterior accessions, or by a regular interior nutrition, has not been ascertained; the former however appears most probable. Most testaceous animals live in water; sometimes in the open sea, sometimes close in shore. They are carnivorous and granivorous, feeding upon flesh and marine plants. Some remain fastened immovably to rocks. Oysters and several other species attach themselves to different bodies by a kind of glue, and not unfrequently they are found heaped upon each other. This adhesion is sometimes voluntary, and sometimes otherwise.

But the knowledge we have of these animals is very imperfect. As they for the most part inhabit the bottom of the ocean, it is very difficult to make exact observations upon their formation, manner of life, propagation, movements, &c. Three or four classes of shell fish are all that can be said to be thoroughly known. Hitherto our researches have been confined to the form and lovely colours with which their shells are adorned; but of their true structure, and mode of life, and the end of their existence, we know very little.

Yet we know enough to furnish us with ample subjects for admiring the infinite greatness of the Almighty. How immense is his dominion! Everywhere we are surrounded by creatures bearing the stamp of the majesty of the Lord. We have only to enter the cabinets of the curious in which shells are preserved, to convince us of this. Let us observe the infinite variety of their form and colour, and we shall not fail to acknowledge that the finger of God is here visible, and that he has no doubt proposed certain ends worthy of his wisdom in their creation.

AUGUST 30.

UPON THE GOVERNMENT OF GOD.

A GOD who, from his supreme elevation, should be an indifferent and idle spectator of all the revolutions which take place in this world, would not deserve our homage. Happily for us, the government of the God we adore embraces all his creatures. We everywhere find the centre of his empire; but we no where see its limits. All his works are for ever present to his view; with a glance he perceives the past, the present, and the future, with all their relative parts and combinations. The smallest events, the most minute circumstances, nothing escapes him: they all enter into the plans which he has formed to produce certain wise ends. And these ends unite to produce the greatest possible happiness for mankind. Yes, O Lord, thou art interested in all thy works; thou canst behold them at a glance, and thou dost govern them by a single act of thy will. Thy laws are dictated by wisdom, and from the fulfilment of thy commandments we derive joy and felicity.

The Almighty by his providence preserves every kind of creature which he has formed from the beginning. Animals die, and are replaced by others. The generations of man pass away, and are succeeded by others. The Creator of the universe makes the animal and vegetable world subservient to the comfort and support of man, who alone is capable of understanding his works. This God, who is holiness itself, wills that his rational subjects should be holy likewise. By the continual proofs he has given them of his love for virtue and his horror of vice, he speaks to their hearts, and excites them without ceasing to walk in the ways he has pointed out. He directs their actions to his ends; he frustrates their designs when they militate against his merciful decrees, and furnishes them with the means of regaining the right path. What various means did he employ to bring back the disobedient Israelites to their duty. In vain the idolatrous nations planned their ruin, they still continued to subsist under the government of their God. He neglected nothing which could preserve among them that pure and holy religion which distinguished them from all people.

But our God dwells in inaccessible light. His government displays the most profound wisdom, which no being can penetrate. Our intelligence is too weak to embrace the plans of the Most High; neither can our limited understandings comprehend the motives of his conduct and his dispensations. Oftentimes the impious sit with princes, while the good languish in the dust. The wicked man prospers, and the pious man is overwhelmed with sorrow and misfortune. And yet there is a providence. Yes, notwithstanding all these apparent disorders, the Almighty is always the tender father of his creatures, the infinitely wise God, the most equitable and just monarch. His counsels are wonderful, his plans surpass our understanding, but they are always executed with sovereign wisdom.

O thou who art discontented with thy lot, consider all these things, and thou wilt cease to murmur. Whence is it, O man, that thou dost presume to fathom the decrees of the Eternal? Thine understanding is limited, and yet thou dost presume to discover the ends which the Creator of all things has proposed? Thou canst not comprehend what passes before thine eyes, thou art ignorant of what has gone before and what shall come after, and yet thou hast the presumption to pronounce upon causes and their effects! Providence is just in all his plans and all his dispensations; it is true that thou canst not penetrate the motives of his conduct; but in order to effect this, thou must become what God is now.

AUGUST 31.

HARVEST HYMN.

OUR fields, crowned with flowers and corn, sing praises to the Eternal; and the reaper's eyes betray the swellings of his grateful heart, which silently ejaculates hymns of praise to the Most High. It is the Lord who causes bread to spring from the ground for our support, and sheds around us innumerable blessings. Let us assemble together, my friends, let us sing praises to our God; let us listen to the voice with which he addresses us from the bosom of our fields.

The year shall crown thee with gifts, O world, thy happiness is my work. I produced the spring, and the harvests are the work of my power; the plains and the hills covered with waving grain, these are mine.

Yes, O my God, we behold thy grandeur and majesty, we acknowledge the price of thy gifts. In thee we live, from thee we derive every means of subsistence. Be ye blessed, ye fields, from whence we procure our food;—unfold your leafy honours, ye lofty forests. O, all bountiful nature, still spread forth your exhaustless stores; for the Lord shall be the object of our praise from the dawn of day to the setting sun. Exempt from all inquietudes, we shall then rejoice in his benefits, and our children shall repeat after us, "The God of heaven is our father; the Lord, the Lord is our God."

SEPTEMBER.

HYMN in praise of the Most High. 1. Omnipresence of the Almighty. 2. Beauty and variety of the butterfly race. 3. Growth of trees. 4. Lion Ant. 5. Resemblance between plants and animals. 6. Nature and properties of sound. 7. Mysteries of nature. 8. Eyes of animals. 9. On fishes. 10. Formation of islands. 11. Influence of the moon upon the human body. 12. Ignis fatuus. 13. Mineral kingdom. 14. Of exotic plants. 15. Reflections upon myself. 16. Comparison of the strength of man with that of animals. 17. Wonderful instinct of the butterfly for the propagation of its species. 18. The vine. 19. Daily wonders performed by the Almighty. 20. On digestion. 21. The sum of this world's good surpasses that of evil. 22. Of the constant warfare in the animal creation. 23. Moral utility of the night. 24. Upon the indifference we manifest to the works of nature. 25. Upon divers nocturnal phenomena. 26. Wonders displayed by the insect tribe. 27. Of amphibious animals. 28. Perfection of God's works. 29. Fruits. 30. Song of praise.

The golden apple weighs
down the branch which bears it
and invites the hand to pluck it. —
29th Day.

SEPTEMBER.

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STURM'S REFLECTIONS.

HYMN IN PRAISE OF THE MOST HIGH.

LET us sing, O, let us sing praises unto our God! The Lord is great! We will now and for ever declare the glory of that good, wise, and powerful Being from whom nothing is concealed.

It is He who has spread the starred canopy of heaven above our heads; there, in the midst of ineffable light, He has established his throne; there, clothed in eternal majesty, He conceals himself from mortal eyes.

I lose myself, O God, in this transcendent splendour; yet every where I find Thee the same benevolent Creator of the universe. Overpowered by the contemplation of the wisdom of thy ways, and penetrated with admiration, I praise and exalt thy holy name.

I glorify thee, O Lord, who governest the world with thy paternal care; who enlightenest it with the rays of the bright orb of day, who waterest it with rains, and refreshest it with dews.

It is Thou who coverest it with smiling verdure, and dost adorn it with flowers; who clothest it with golden harvests, and who daily and yearly dost renew its beauties and fertility!

Thy cares extend to every thing which exists, and the least of thy creatures is the object of thy benevolence. The young raven, covered with snow, and seated on the arid rocks, cries to thee for food, and is satisfied.

At thy command the limpid streams gush from the barren mountain; the sun matures our grapes, and paints the orchards with a golden glow.

Thy zephyrs lightly play among the forest trees.

At the appearance of thy splendid sun, all nature starts to life, and man pursues his labours till the shades of night again invite him to repose.

The feathered tribe at dawn of day pour forth their choral praises, and join with man in songs to the Most High.

Towards Thee, the Father of all creatures, towards Thee are all eyes directed; for from Thee they receive the means of happiness.

Glory then to the Most High. And you, ye starry hosts, ye worlds which at his omniscient word sprang from chaos into beauteous being, join the universal hymn, and proclaim the praises of the God of mercy.

SEPTEMBER 1.

THE OMNIPRESENCE OF THE ALMIGHTY.

THOU art ever present, O God Almighty. Thou art near and afar off; thou fillest the universe. Here grows a flower; there shines a sun. Thou art evident in both. It is thy spirit which breathes in the soft zephyrs and howls in the wintry blast;—in the noonday splendour thou art visible, and the darkness of the night proclaims thy presence. Thou art equally manifest in the atom as in a world. Thou art present with me in this green valley, thou hearest my feeble accents, and at the same moment the song of the veiled seraphim, who at the foot of thy throne strikes his resplendent lyre in hallelujahs, sounds also upon thine ear.

O thou, who art my God, as well as the God of the bright seraphim; whose ear is equally open to my faltering song and his celestial lay; O thou who listenest with patient ear even to the warbling of yon melodious skylark, and the soft humming of the industrious bee which flutters on from flower to flower; if thou indeed wilt listen, O, grant my earnest prayer; grant that I may always feel I am in thy awful presence, and so conduct myself that when cited to appear at thy tribunal in the world of spirits, I shall not fear to stand before the face of my all righteous Judge.

SEPTEMBER 2.

BEAUTY AND VARIETY OF THE BUTTERFLY RACE.

Let us, before this brilliant race of insects has passed away, consider them a little; perhaps both pleasure and profit may result from their examination.

The first object which fixes our attention in these beautiful inhabitants of the air is their splendid attire. Some indeed are clothed in more sober habiliments, and some display slight ornaments upon their wings; but others again are most profusely covered with all that can delight the eye. This latter class shall engross our attention for a few instants. How beautiful are the tints which decorate them! how lovely those spots, which heighten the effect by contrasting with the former! With what delicacy, what taste has nature designed them! But however great my admiration of this small insect, when examined with the naked eye, it is as nothing when compared to that exerted by the view unfolded to me by the microscope. Who would ever have supposed that a butterfly were ornamented with feathers? Yet nothing is more true; and that which we call dust or down is in fact feathers. The structure of these, their arrangement are as symmetrical as their colours are beautiful. The tube which is attached to the wing is the strongest part of the feather. The exterior parts are exquisitely fine. If the wing is roughly seized, the plumy particles which we call down are swept away, and the wing then presents the appearance of a fine and thin transparent skin, in which can be discerned the cells or receptacles of the tubes of the feathers. This skin differs from the rest of the wing as much as the finest lace does from the coarsest cloth; it is more porous, more delicate, and surpasses the most exquisite embroidery; its outer edge is adorned with beautiful fringe. Our finest laces appear like sailcloth when compared with the tissue of the wings of a butterfly; and our most delicate thread resembles a cable. Such is the great difference between the works of nature and art when viewed through a microscope. The former are finished to perfection; the latter, even the finest specimens, are coarse and unpolished. How fine are the threads of cambrick! how even, how regular they appear; and yet seen through a microscope, they appear like packthread, and seem to have been spun and woven by a basket maker, rather than by a skilful artisan.

But the most interesting and wonderful property of this insect is its transformation from a crawling worm to a winged habitant of the air. Behold how the butterfly unfolds its brilliant wings to the sun, how it seems to exult in its new existence! how it flutters from flower to flower! Its wings display the magnificence of the rainbow. How beautiful it is! how is it changed since the time when it crawled in the dust, exposed to a thousand dangers! Who raised it from the earth? Who endowed it with the faculty of skimming lightly through the thin air? Who bestowed upon it those lovely wings? The Lord of heaven and earth; its author and mine. In this insect I behold the transformation which awaits me at a future day. That day will come, when I shall cease to crawl upon this earth; when I, purified and made holy, shall rise above the clouds, and, free as the spirits of God who now surround him, shall wing my flight beyond the stars, through all the boundaries of space.

SEPTEMBER 3.

GROWTH OF TREES.

Every tree, however large and leafy it may be, receives its principal nutriment from the lower parts or roots, and it is supposed that the circulation of the sap in trees takes place much in the same way as the circulation of the blood in animal bodies. The exterior parts of the root consist of a prodigious number of spungy fibrous substances and balls of air, which are always open in order to receive the nutritious juices from the earth. This juice is at first mere water charged with earthy particles; but by its mixture with a milky substance, with which every tree is furnished more or less, it acquires its nutritive qualities before it is diffused through the plant.

The microscope has disclosed to us that wood, notwithstanding its hardness, is composed entirely of innumerable small hollow fibres. The greater part, particularly those in shrubs, ascend perpendicularly; but in trees of larger magnitude these tubes are strengthened by others which pass horizontally from the surface to the centre of the body of the tree. Attracted by the warmth of the sun, the sap rises gradually to the external parts much in the same way as the blood is diffused by the arteries to the extremities of the body of animals. The sap thus circulates through the twigs and branches as well as through the larger vessels of the trunk which lie between the inner and outer bark. It is owing to this process that the growth of the tree is matured. And hence it arises that, by cutting a branch transversely, we can ascertain the age of the tree. The root increases in size with the upper part of the tree. The outer bark may be considered as a species of clothing, acting also as a ligature to the internal parts, and protecting those more delicate from mischances arising from the intemperance of the weather or other casualties.

Thus has the wise Creator of the universe formed an admirable system of solid and fluid matters, which unite in giving health, strength, and growth to that portion of the vegetable world called trees. Those delightful ornaments of our fields, which afford to our flocks, shepherds, and cottages a delightful shelter from the rays of the noon day's sun. But their utility does not end here, for when cut down, they procure for man most of the necessaries of life. Immutable are the laws prescribed by Providence to all his works. So much wisdom, so much art, so many preparations and combinations which we discover in the production of one single tree should excite in us the deepest veneration and admiration for the creating mind which fashioned them. The contemplation of so much wisdom is enchanting, and is capable of exciting us to glorify God, so great in his counsels and plans, and so all powerful in their execution. The conviction of the omniscience of Providence should induce us to commit our interests to the hands of Him who can never want means to convert every thing to good for his creatures. Encouraged by this feeling, we should raise our eyes to Him from whom all good things do proceed, and supplicate an increase of wisdom and an increase of virtue.

Oh, may I resemble the stately tree; may I grow in virtue, and bear fruits suitable to the lot assigned me! May my soul increase in fortitude! may I stem the torrents of misfortune and brave the storms of life, and chiefly may I encourage the feeling of deep humility. Let me not resemble that withering tree which the more it decays becomes but firmly attached to the earth! The nearer I approach the tomb, so much the less would I have my affections rooted in this lower world.

SEPTEMBER 4.

THE LION ANT.

No insect is so renowned for its address as the formica leo, although its figure announces nothing remarkable. It is not unlike the woodlouse; its, body which is furnished with six feet, is composed of several membraneous rings terminating in a point. The flat and square head is armed with two movable and hooked horns, the singular construction of which displays the admirable wisdom of the Creator in his smallest works.

This insect is the most cunning and most formidable enemy of the ant; its arrangements for catching its prey are most ingenious. He mines a piece of ground in the form of a tunnel at the bottom of which he lies in ambuscade, to seize upon any luckless ant which may chance to fall into his snare. In the performance of this operation he displays much art, drawing a circular mark on the surface of the ground, the precise size of his future tunnel, the opening of which is always in proportion to its depth. He then traces another circle, the size of the bottom of the funnel, and from this point he commences his work, throwing up the sand on all sides with his head until his task is completed. His head, being flat, acts as his shovel. Occasionally he throws the sand up with one of his fore feet. When he meets with coarse grains of sand or bits of hardened earth, he puts forth all his strength to hurl them forth; sometimes he makes use of his back to perform this office, and so persevering is he that he will repeat his efforts six times to accomplish his end.

His work being completed, he takes his station in ambuscade at the bottom, where he lies quite still. If an unlucky ant approach the mouth of the funnel, he can hardly fail to fall headlong to the bottom, where he meets an untimely fate. When the body of the poor ant has completely lost all nourishment, the lion ant throws it out of his den, repairs any damage it may have received in his late attack, and then again places himself in ambuscade. If perchance the ant should not fall to the bottom, but lodge on the side of the funnel, his enemy immediately throws up with his head a quantity of loose sand, which overwhelms the ant and precipitates it to the bottom.

All the actions of this creature are so exceedingly curious that one cannot fail to admire them. The lion ant prepares his toils before he has seen the insect he means to entrap; yet all his preparations tend to the best means of procuring a subsistence. How could an animal, so slow in its movements, catch its prey unless by stratagem? All its actions are regulated by fixed principles; the shape of its funnel and the manner it works are equally and best suited to the means they are intended to produce. The instinct which directs this animal discovers to us a Great First Cause, intimately acquainted with every thing necessary to contribute to the preservation and well being of this curious animal. The skill he displays is not the result of experience, but is bestowed upon it at the first moment of its existence. We must trace it to the wisdom, power, and goodness of God, who has proportioned the instinct of animals to their divers wants and necessities.

These reflections furnish me with new incentives to praise and glorify thee, O Lord, thou who art equally the Creator of mankind and the lion ant. Bountiful Source of all life, thou hast pleasure in diffusing this portion of thy essence, and thou hast formed this insect, so that existence is for him a blessing. Thou hast endowed him with faculties bordering upon reason, and furnished me, by its wonderful properties, with a more intimate knowledge of thine omnipotence and omniscience. The natural history of the most insignificant insect shall lead me to raise my eyes to Thee, who art equally the God of the crawling worm and of the stately elephant.

SEPTEMBER 5.

RESEMBLANCE BETWEEN PLANTS AND ANIMALS.

It is a much more difficult task than one would imagine, to determine the difference between the animal and vegetable kingdom. It is by imperceptible degrees that nature descends from the former to the latter; and in order to define this difference, man must be endowed with the penetration of an archangel. Numerous are the points upon which they differ, yet there are many of strong resemblance.

The seed is to the plant what the egg is to the animal. From the former issues a small stalk or leaf so soon as it is matured, and from the latter proceeds the animal, anxious, when completely formed, to breathe the pure air. Thus we may in fact proceed to find out many resemblances by a minute observation of the operations of nature.

Plants, like animals, are subject to internal and outward maladies, and death is common to both. The surface and interior of the earth, air, and water teem with animals of various descriptions, and numberless are the treasures of the vegetable kingdom which are found in these elements. Animals are indeed more numerous than plants, but the size of the largest tree approaches if it does not surpass that of the huge whale, which extends to seventy or eighty feet.

We are almost inclined, from this slight examination of plants and animals, to pronounce them of the same class, since nature passes imperceptibly and by degrees from the one to the other. This is very certain at least, that we have discovered many positive resemblances between them, but no real and essential difference. And even admitting the latter were to be established, it must always be confessed that nature diversifies her works by such minute touches that they are scarcely discernible to human intelligence. And who can tell what discoveries are reserved for our posterity? Plants may yet be discovered which more nearly approach to the animal world; and animals which bear more resemblance to plants than the curious class—the polypes.

Let us, my dear reader, employ the little knowledge we do possess to that good effect which the truths of nature are calculated to produce; let us employ it to the glory of God and our own spiritual advantage. The resemblance of plants and animals should convince us of the power and wisdom of that Being who has imprinted upon all his creatures the character of infinity. Let it also teach thee humility, O man. Thy nature partakes also of that of the plant and the animal, and it is to the Saviour of mankind alone that thou art indebted for thy situation between the brute and the angel. Endeavour by acts of piety to approach the nearest to the heavenly spirits. And since it is permitted to thee to bear some resemblance to the Great Spirit of spirits, strive incessantly after this exquisite felicity; think upon what thou art,—upon what thou shalt be.

How wonderful is that being which, like the brute, receives its nourishment from the bosom of the earth, and yet, like the angels, raises its thoughts towards heaven! A creature, whose one half perishes, while the other is destined to immortality, holiness, and perfection; to liberty, with submission to God; to a life of eternal praise and happiness.

SEPTEMBER 6.

NATURE AND PROPERTIES OF SOUND.

Every sound is produced by air, but it is necessary that the latter should be in motion. Yet every motion of the air does not produce a sound, because if that were the case, we should be annoyed exceedingly by incessant noises of every description. In order to produce sound, the air must be suddenly compressed, and as suddenly resume its former position. By this process undulating waves are formed, just as waves and circles are formed in a still water when a stone is thrown into it. This undulation and vibration extend to a very great distance in a circular direction, unless they meet with somewhat which repels or impedes their expansion: and hence it is that we are sensible of sounds, for if they were confined to the spot where the air is immediately compressed, we should form very imperfect ideas of what was passing around us. The extension of sound is prodigious and rapid. Sound travels at the rate of a thousand feet in a second.

This calculation, verified by innumerable proofs, is of the greatest importance to us: it contributes greatly to our security upon many occasions, for by it we are informed of the distance of thunder and many other concussions of nature, and thus are enabled in some degree to shelter ourselves from danger: by counting the beating of the pulse between the lightning and the thunder, we can ascertain its proximity to us. In the same manner we can determine upon the distance between two places or two vessels at sea. It is very remarkable that a feeble sound extends as rapidly as a stronger one, although the latter is produced by a more violent agitation of the air than the former.

But all these curious observations upon sound, upon which philosophers have bestowed so much time, would avail me but little if my body were not constructed so that I should be capable of receiving sound. I bless thee, O Lord, first for the production of sound by the compression of the air; and secondly that thou hast endowed me with organs capable of receiving an impression of those sounds. A thin and elastic membrane spread over the furthest cavity of my ear, like the parchment of a drum, receives the vibrations of air, and thus I become sensible of external sounds. Thus far our understanding will assist us; but if we inquire how it is that speech conveys ideas to our minds instead of simple sound; or whence it is that sound has the faculty of producing so many various impressions upon the soul, here we are obliged to confess our total ignorance.

In this, as well as upon every other occasion, we can but be convinced of the wisdom and goodness of the Almighty. Sounds, and the faculty of hearing and comprehending those sounds, have bestowed upon man an inexhaustible source of amusement and delight, and have also rendered him capable of enjoying, by social and religious intercourse with his fellow creatures, a foretaste of the pleasures and joys of heaven. By the means of sound or speech, man makes known his wants and expresses his satisfaction; and in this he is superior to the brute creation: he can also, if his hearing receives an injury, apply to his use a speaking trumpet. It often happens that one ear is deprived of its sense while the other retains it; and even when the external membrane is wounded, the internal one, which terminates in the mouth, may retain its faculty.

Innumerable pleasures arise from the sense of hearing; the sounds produced by musical instruments vibrate in grateful harmony upon our auditory nerves, which convey with the greatest fidelity the sounds of an infinite variety of sonorous bodies.

With what sentiments of gratitude am I not penetrated when I contemplate this inestimable gift! Oh, may I never become insensible to so great a blessing! My songs of praise shall extend as far as sound can reach, the universe shall resound with them; the heaven, the earth shall hear the great things which thou hast done for me.

SEPTEMBER 7.

MYSTERIES OF NATURE.

So soon as man attempts to penetrate the causes of the effects by which he is surrounded, so soon is he compelled to acknowledge his own insufficiency. Our knowledge of nature, of which we are so proud, extends little farther than to a superficial acquaintance with the effects of a few things which most frequently occur to us, and to apply them to our own use in the best possible manner. But to discover the causes of these effects, and how they are produced, remains very generally an impenetrable mystery. There are even a thousand effects in nature which remain perfectly concealed from us; and even with regard to those which we are enabled to explain, there still remains a degree of obscurity, which confirms, that we are but men. We are totally ignorant of the causes of some of the phenomena of nature; others are very doubtful; and small indeed is the number which we dare pronounce upon with certainty.

We feel the wind blow, we are sensible of its great and overpowering effects; but we know not exactly from whence it proceeds, what increases its violence, and what appeases it. We see that a grain of wheat produces first the stem, then the ear of corn, but we are ignorant how this is effected. We are still more at a loss to comprehend how the wide spreading oak should have issued from an acorn, and grown in size until the birds find shelter within its thick foliage, and the beasts of the field beneath its broad shadow, while man converts to his use every part of its valuable productions. The food which we eat, and which is of such different natures, is transformed to our substance. We are acquainted with the wonderful effects of the loadstone, and we conclude they are produced by certain causes; but whether the loadstone acts by an innate attractive power, or whether it is surrounded by it only, we dare not pronounce. We are sensible of cold, but no naturalist has hitherto discovered its origin or its constituent parts.

We are better informed than our ancestors respecting the origin of thunder, but we are still ignorant as to the nature of the electric fluid itself, which produces such terrible effects. The eye is sensible of objects painted on its retina; the ear of sounds produced by the vibration of air; but do we know how these wonderful perceptions are imparted? The soul is united to the body while we live, this we feel and know; but who can explain how their wonderful union is effected? The effects of fire and air are continually before us; but who is there can describe their integral parts? All our boasted knowledge upon effects and causes in the natural world may pretty generally be reduced to mere conjecture and probable conclusions. The hypothesis advanced by philosophers upon many of these subjects serve but to prove the limits of human understanding.

Nature presents to us at every step a world of wonders, which elude our researches; and whatever discoveries, whatever researches we may have made, there are a thousand and a thousand objects which evade our grasp. It sometimes may happen that a luminous explanation may be given of certain phenomena; but the principles, the master springs, their nature, and manner of acting, are certainly raised far above the sphere of human comprehension.

The mysteries of nature should convey to us lessons of wisdom respecting the mysteries of religion. The Almighty has so ordained that the natural world should contribute to our happiness, although he has concealed from us the causes which produce this happiness. Thus too in the spiritual world, eternal life and grace are bestowed upon us, although we know not how they operate. Is there any one who would refuse to eat and drink until he could actually and positively comprehend how his food became the means of imparting life and strength; or would any man refuse to sow and plant until he fully understood how the wonderful operations of vegetation were carried into effect? Man is not so extravagant; on the contrary, he observes the productions of nature, and experience teaches him to apply them with a grateful heart to his use.

But whence is it that mankind act so differently with regard to the mysteries of religion? We dispute upon the nature, effect, and operation of grace, and neglect its salutary influence. Oh, why are we not as wise in spiritual as in worldly matters? Instead of yielding to vain speculations, let us gladly embrace the salvation offered to us by God, and hold fast our faith with fidelity. For this purpose did the Almighty bestow it, and not that we might indulge the curiosity of vain and idle minds. God forbid that I should be so presumptuous as to hope to penetrate the mysteries of nature and those of revelation, or dare to criticise or question them. Let me rather acknowledge the weakness of my understanding and the infinite greatness of the Almighty; then every mystery will excite me to adore that Great Being whose works are marvellous, and ways past finding out.

SEPTEMBER 8.

THE EYES OF ANIMALS.

THE simple consideration of the eyes of divers kinds of animals is sufficient to prove to us the wisdom the Almighty has displayed in the formation of his creatures. He has imparted the sense of seeing in the same manner to all animals, but he has diversified their organs as most convenient to each kind individually. Let us then, my dear reader, reflect upon this subject, and I promise you the meditation will bestow upon us one of the noblest pleasures of which the soul is capable of partaking.

The eyes of all animals appear round. But there is a great diversity in this spherical form. Their situation in the head near the brain, the most sensitive part of the body, is likewise very varied. The eyes of men and of most quadrupeds are furnished with six muscles each, to move them from side to side. They are so constructed as to look straight forward, and to take in at the same time a semicircular view. But here again we must make exceptions. Horses, oxen, sheep, hogs, and many quadrupeds are furnished with a seventh muscle, to support the eye, because their heads incline so much downwards while they are seeking their food. The eyes of frogs are protected by a transparent but closely woven membrane, from the dangers to which they are exposed by alternately inhabiting land and water. Gnats, flies, and other insects enjoy a more perfect vision than other animals; they have almost as many eyes as there are openings in their cornea. Thus they are enabled to see on all sides without interruption, because the one or other of these little eyes is always directed to some surrounding object. Fishes could not see in the water if the crystalline of their eyes were not nearly spherical, the better to collect the rays of light. They have no eyelids, neither can they draw back their eyes, but their cornea, which is as hard as horn, is sufficient to guard against all danger.

It was formerly thought that the mole had no eyes; two however have been discovered, black and no bigger than a pin's head. As this creature is always groping in the earth, it was necessary its eyes should be small, deep set in the head, and covered with hair. Snails' eyes are fixed at the extremity of its long horns, which it has the faculty of stretching out, drawing back, or raising at pleasure, as the objects are far or near from them it wishes to discover. In those animals which have not the faculty of moving their eyes, the deficiency is supplied by other means. Some spiders have four, some six, some eight eyes, all placed on the forehead of a round and immovable head; they are bright and transparent, and resemble a bracelet crowned with diamonds. These eyes are differently placed, according to the different necessities of the different insects.

The chameleon has the singular property of moving one eye, while the other remains fixed; to direct one towards the earth while the other is looking towards heaven; it can also by a slight movement of the head look behind and before it at the same time. The same faculty is observed in some kinds of birds, hares, and rabbits, whose eyes are very convex. These examples, which it would be easy to multiply, display the wisdom and tender mercy of the great Creator of all things for the preservation of the most essential of the organs of sense. It has pleased his omnipotence to dispense the blessing of light to his creatures in various ways. And we cannot but be struck with astonishment when we consider the admirable art, the precautions which have been taken to preserve this most precious of senses from the dangers which threaten it. Every part of the bodies of animals is arranged in the most exact proportion, and in the manner most suitable to their divers wants and destinations. Any other arrangement of the eyes of animals than that which actually exists would be productive of the greatest inconveniences. For it is not only for the ornament and decoration, but for the comfort and convenience of animals that the situation of their eyes is so diversified. Let us therefore, in considering this interesting subject, celebrate the praises and glory of God, which it displays in such striking, such glowing colours.

SEPTEMBER 9.

ON FISHES.

Who would have ever imagined that nature contained such a class of animals as fish, if we had not seen them? If a naturalist knew of no animals but those which walked upon the earth, and which breathe as we do, would he have believed there were creatures which lived in water, and which enjoyed all animal functions with pleasure, and would he not conclude such a description to be mere fiction? The nature and life of fishes, their structure, formation, movement, and proportion are perfectly wonderful, and furnish ample proofs of the all powerful wisdom of the Almighty. In order that these animals might live in water, it was necessary their bodies should be totally different in their essential parts from those of beasts or birds. Why has the Almighty given to most fish a thin, slender body, flat at the sides, and always a little sharp towards the head, but to facilitate their swimming, and enable them to cut through the water easily? Why are their bodies covered with scales? to protect them from injury by the pressure of the water. Why are others clothed as it were in an oily glutinous substance? the answer is evident, to protect them from the cold. Why are the eyes of all fish sunk deep in their heads, and why is the crystalline humour spherical? we have already answered this question, and it is manifest that, in the arrangement of all their parts, the Creator has adopted those forms and arrangements most conducive to the comfort and well being of these animals.

But these are not the most wonderful points in the construction of fish. Their fins are almost their only members, yet these are sufficient to execute all their movements. By means of their tail fin they move forward; the back fin directs the movements of the body; the pectoral fin assists them in rising, and the ventral fin keeps them in equilibrium. The gills are the organs of respiration; they are seated at the back of the head, four on each side; the upper ones are the largest. They are constantly taking in water at the mouth, and ejecting it through these gills. The blood which issues from the heart, and which is carried through the veins of the gills, does not, as in terrestrial animals, return again to the heart by the means of lungs, but is immediately distributed through every part of the body. One of their principal organs for swimming is a bladder of air in their belly, connected with the stomach. By means of this bladder they can make their bodies lighter or heavier at pleasure. When they rise to the surface of the water, they extend it, and when they descend they contract it: by this operation their bodies become heavier specifically than the element they inhabit, and they naturally sink to the bottom. If this bladder is pierced, the fish can no longer rise to the surface of the water.

The prodigious number and great variety of fish is truly astonishing. The waters of Germany alone contain upwards of four hundred different species; what then must be the aggregate number of those to be found in the whole world? Fish present to us the largest specimens of the Almighty's works, and also those the most minute. Some are long, and as thin as a thread; others broad and thick: some are flat; others cylindrical, triangular, &c.: some are armed with a horn, a sword, or saw. The strength of certain fish is exceedingly great; they will spout up of the water through their nostrils to a surprising height.

We know not, in contemplating so many wonders, whether most to admire the wisdom and power of God, or his bounty in bestowing these creatures upon us for our use. To an attentive observer both present ample subjects for glorifying his almighty name. What grandeur dost thou not display, O my Creator, in all thy works. The elements proclaim thy glory, the animal creation thy power. The whale, whose huge back resembles a floating island, the gold fish, which dazzles in the sparkling stream, these alike declare to us their Author, and thy bountiful goodness to us thy creatures. Of how many delicious wholesome aliments should we be deprived if the liquid plains, so destitute of trees and fruits, were not inhabited by animals, creatures as fruitful as they are delicious, and which so abundantly supply our wants.

SEPTEMBER 10.

FORMATION OF ISLANDS.

THE formation of islands has of late much engrossed the observation and excited the curiosity of mankind, and from these researches much curious information has been procured. Most of the small islands of Austral Asia are supposed to have originated from the silent labours of the corallina, a small insect, which from the bottom of the ocean raises its coral dwelling till it forms prodigious reefs of rocks: upon these rocks of coral the high tides deposit sand, shells, pummice, pebbles, mud, and weeds; to these may be added roots, wood, and soil, besides seeds dropped by birds: in process of time these become fixed, and as the new island assumes consistency, tropical trees, vegetables, &c. are cast upon it, till at length birds find shelter amidst the new-sprung foliage, and the weary mariner gladly lights from his little bark, to wander amidst the picturesque beauty of the coral island. But islands are not always so quietly nor so silently formed. Sometimes the subterraneous fires beneath the ocean, forced from their volcanic bosoms, rise to the surface, bearing with them rocks and stones of prodigious size. Most of the islands in the Turkish Archipelago appear to have been formed in this manner. In the year 1807 there was a terrible earthquake at Santonini, one of the islands of this Archipelago, accompanied by a fall of pummice stones. The astonishment and terror of the inhabitants were greatly increased by the sudden appearance of huge rocks rising from the bosom of the deep, accompanied by large quantities of smoke and flames. Some of the inhabitants rowed towards it, and even ventured to land upon this new-formed island; but the ground rocking beneath them, they made a hasty retreat, and at an awful distance contemplated this phenomenon of nature. The sea appeared to boil and steam in various parts around it: a rumbling noise was then heard as of distant thunder, which gradually increased; occasionally this noise resembled that produced by heavy bodies falling from a great height into a large body of water; this was followed by the sudden burst of flames, accompanied by such a display of rockets, for such they may be called, that the darkness of the night was turned to the brilliancy of day. After this explosion the island, which had appeared as two, became united by a violent concussion; still however throwing up flames, and displaying at times the awful scenery presented by volcanic eruptions and earthquakes. From May, 1807, until July, 1808, this island continued to display a succession of phenomena no less terrific than wonderful.

Great and wonderful art thou, Lord God Almighty, in all thy works, and who shall abide the terrors of thy hands? The more closely we investigate thy works, the more are we lost in astonishment. Who could have imagined that an insect, so small as to be almost invisible to the naked eye, should by its unperceived and silent labours assist in the formation of the immovable islands: or that the internal fires of the earth should be so powerful as to force through huge rocks to the stormy deep, or bid the cold ocean boil and foam, while the unquenchable flames should rise and play upon its surface, as though fire and water were but the selfsame element.

But if the terrors of this scene appal our souls, what will be our feelings when the heavens themselves shall shrivel like a parched scroll, and disclose to our astonished view a new heaven and a new earth.

O my God, be thou with me now and for ever, lest at this terrible moment I call on the earth to cover me, and the hills to fall on me.

SEPTEMBER 11.

INFLUENCE OF THE MOON UPON THE HUMAN BODY.

In former times certain influences were attributed to the moon, which greatly contributed to excite and confirm many superstitions and ill founded terrors. The gardener did not plant until he had observed the state of the moon; and the sower withheld his seed until he felt assured of her genial aspect. Invalids were scrupulously attentive to the variations of the moon, and physicians themselves were as particular in the orders they gave that her aspects should be observed. By degrees these prejudices have greatly diminished, and the empire of superstition, at least as far as relates to that planet, is no longer universal. This is one of the advantages which our present century possesses over all former ones: an advantage which is not duly appreciated, although it well merits that we should acknowledge our obligations for it to the Giver of all good. And it is our duty to endeavour more and more to extirpate those ancient superstitions which have had such prejudicial effects upon the human mind.

With regard to the effects of the moon upon our bodies, let us keep a just medium. For as it would be irrational to attribute to it a too powerful influence upon the human body, so would it be too presumptuous totally to deny this power.

The moon produces great variations in the air, and thus she may indirectly have some influence upon our bodies. The moon may cause such great alterations in the superior regions of the atmosphere that earthquakes, winds, heat, cold, exhalations, fogs, &c. may be the result; and as our bodies could not fail to be affected by these transitions, the moon may be said to have some influence upon them. It has been often observed that persons afflicted with certain complaints feel a considerable accession of pain at the new and full moons. And this is not at all surprising, for if cold, damp, and cloudy weather affect our health in opposition to dry and sultry weather, it naturally follows that the moon, which produces these changes, should influence the animal system. The action of this planet upon the human body is founded upon incontrovertible principles: if the moon affects the weather, and the weather affects our health, then has the moon influence upon our bodies.

Perhaps too there is an ebb and tide in the blood, which is produced by the moon. Why is it that most periodical maladies take place at the end of four weeks rather than at a period longer or shorter, if they were not in some degree affected by the moon?

It is in general a principle we should admit, since it redounds to the glory of our Creator, that there are certain relations which unite in their effects upon the animal world. The atmosphere, no doubt, contains many unknown and wonderful properties, occasioning revolutions of various kinds in nature. Who is there who shall presume positively to say that many of the phenomena of our bodies are not dependent upon the moon? Perhaps the light which she gives us at night, though so grateful to us, is not the principal cause for which she was created. Perhaps from her proximity to the earth she produces certain effects which the other celestial bodies, from their great distance, could not effect.

The universe and the worlds it contains form one vast and perfect chain, the smallest link of which, if it were broken, would be followed by wild uproar, and chaos would come again. Harmony, beauty, and variety unite their influence in the formation of all the works of nature.

From whence is it then, my brethren, that the influence of the moon and other stars should conjure up such vain and superstitious fears? If you believe that it is God who has created the world, and prescribed those laws which keep surrounding worlds within their orbits, how can you yield to vain terrors, so unworthy your confidence in the great Creator? And if you are really persuaded that he governs all things with wisdom and goodness, is it not natural that you should trust in him, and rely with tranquillity and joy upon his good providence?

SEPTEMBER 12.

THE IGNIS FATUUS.

THE ignis fatuus is a meteor or small fugitive flame which in dark nights arises from marshy grounds, churchyards, and some other places; and it is produced by the gaseous exhalations of putrified bodies taking fire by the contact of atmospheric air. It moves about, and seems to fly off, because the gases at once taking fire in different places, and becoming almost instantly extinct, the appearance is of the same light, wandering from one spot to another, while the fact is that several flames follow each other in the most rapid succession, without any perceptible degree of light, till the matter composing the vapour is consumed.

Elevated grounds have not sufficient moisture to produce the exhalations, and hence we are to look for them among bogs and in marshy grounds, along the sides of hedges, or the course of rivers, the currents of air being greater in these places than elsewhere.

Analogous to this meteor is the draco volans, a fiery exhalation common in marshy and cold countries during the summer season. Its appearance is that of an oblong, sometimes roundish, fiery body, with a long tail, entirely harmless, for it may frequently be seen sticking to the hands, and rolling on the clothes of travellers, without doing them the least injury.

The ignis lambus, which Virgil describes as playing round the head of Iulus, proceeds from an inflammable vapour foreign to the atmosphere, which serves merely as a medium for its formation.

All these meteors are pure accidents; scarcely do they appear in the atmosphere ere they disengage themselves from it; and the sense of sight only can measure the moments of an existence too short to have any influence on terrestrial phenomena.

The ignis fatuus is very common in Spain and Italy; and Dr. Shaw describes a very remarkable one that he saw in the Holy Land, when the atmosphere was so thick and hazy that the dew on the horses' bridles was remarkably clammy and unctuous. This meteor was sometimes globular, then like the flame of a candle; afterwards it so spread itself as to involve the whole company in a pale harmless light, and then it would contract again, and suddenly disappear; but in less than a minute again become visible, and, running along from one place to another with a swift progressive motion, would again expand itself, and cover a considerable space of ground.

In the year 1693 a fiery exhalation ignited sixteen ricks of hay, and two barns filled with corn and hay in Harlech, Pembrokeshire. This meteor advanced from the sea, and lasted for a fortnight or three weeks, as a weak blue flame, easily extinguished, and perfectly harmless to the people who interposed their endeavours to save the hay. It also poisoned the grass for the extent of a mile, so as to induce a distemper among the cattle.

How do men terrify themselves with vain fears, which originate only in their own imaginations. We should spare ourselves many useless fears if we would but examine those objects which excite our terror. The ignis fatuus, which appears to flee before the person who follows it, is in fact driven by the air which that same person puts in motion. Thus it is in the moral world: with what ardour do we not pursue the goods of fortune, without at all examining whether they merit so much zeal, and whether they will really procure for us that happiness we conclude will result from them. The ambitious and the avaricious are not more happy in the pursuit of wealth and honour than was Robert Flod in the pursuit of an ignis fatuus.

What do we obtain by our constant efforts to attain wealth and honour? Very generally these flee from those who seek them, and fall to the lot of those who pay them little attention.

SEPTEMBER 13.

THE MINERAL KINGDOM.

We require numerous metallic articles to complete the conveniences in our domestic establishments; and if the materials of which they are manufactured had not been very profusely scattered throughout the earth, considerable inconvenience would have been experienced by mankind; yet may the surface of the earth be cultivated without any hinderance, since it is not encumbered with metals to the prejudice of plants and animals. Metals, stones, and several other substances, which we continually use, are enclosed in the earth beneath our feet, in immense receptacles, from which we extract them as our necessities require. These minerals are deposited within our reach, the surface of the earth covering them like a dome, and being sufficiently thick to produce nourishment for man, yet being so thin in comparison of the whole mass of our globe that we can with some labour dig through it, and obtain the substances contained in those vast storehouses of nature.

The substances in the mineral kingdom have been divided into four classes, each having its distinguishing characteristic. The earths have been allotted to the first class, and include such bodies as are not dissolved by water, fire, or oil; such bodies in fact as are not malleable, and bear the action of fire without losing any of their substance. To this class has been assigned also such stones as are composed of the earths.

And stones are of two kinds, precious and common. The latter are the more numerous and useful, the former the more rare and highly prized. Some stones are perfectly transparent, and these appear to be the most simple; others are more or less opaque, according to their composition.

Salts, assigned to the second class of the mineral kingdom, are divided into acids and alkalies; the former are sharp and sour, the latter bitter, having the property of changing vegetable blues into greens, whilst the acids convert blue into red. And the combination of these two forms what are called neutral salts. All these salts conduce to vegetation, and probably even to unite and strengthen the parts of plants, as well as other compound bodies, and they produce fermentation, the effects of which are so various.

The third class of the mineral kingdom has been made to comprehend those inflammable bodies which are called bituminous. These burn in the fire, and when pure dissolve in oil, but never in water. They differ from other minerals by containing more of inflammable matter, which renders those bodies, in which it is found in a sufficient quantity, combustible, and there is more or less of it in all bodies.

The metals assigned to the fourth class, and the heaviest of all bodies, become fluid if exposed to the action of a strong heat, and resume their solidity when cooled. They are resplendent and malleable; some of them, when melted in the fire, lose none of their weight, and are thence called perfect metals, as gold, silver, platina. The imperfect metals are destroyed more or less readily by the action of the fire, and are converted into oxides. One of these, lead, has the property of being converted into glass, and of vitrifying all other metals except gold and silver. Mercury, lead, quicksilver, iron, and tin are considered imperfect metals. Others have been denominated ductile and malleable, and are thence called semimetals, as platina, bismuth, nickel, arsenic, antimony, zinc, cobalt.

This division is however but little regarded, and the metallic substances at present known are thus arranged:

1. Platina
2. Gold
3. Silver
4. Mercury
5. Rhodium
6. Palladium
7. Iridium
8. Osmium
9. Copper
10. Iron
11. Nickel
12. Tin
13. Lead
14. Zinc
15. Bismuth
16. Antimony
17. Tellurium
18. Arsenic
19. Cobalt
20. Manganese
21. Chrome
22. Molybdena
23. Uranium
24. Tungsten
25. Titanium
26. Columbium
27. Cerium
28. Potassium
29. Sodium
30. Barium
31. Calcium
32. Magnesium
33. Strontium
34. Yurium
35. Aluminum
36. Glucinum
37. Zirconium
38. Selenium and
39. Cadmium.

The whole mineral kingdom may be regarded as the workshop of nature, where she secretly labours for the benefit of the creation; but we are ignorant in which way she operates, and we cannot discover how she forms the various substances which she presents to us. We are not well acquainted with the surface of the earth, much less do we know of its interior. The deepest mines are not more than six hundred fathoms below the surface of the earth, and that is not the six thousandth part of the earth's diameter. This alone is sufficient to convince us of the impossibility of having an exact knowledge of the nature and formation of the various substances in the mineral kingdom. But fortunately in the use which we make of the gifts of nature, it is of little consequence whether we are intimately acquainted with their origin and first principles. It is sufficient for us to know how to apply them to the most beneficial purposes; and we know enough of them to be convinced of the glory of the Creator, whose power, wisdom, and goodness are manifest in every thing above or beneath the earth.

SEPTEMBER 14.

EXOTIC PLANTS.

We are not in general sufficiently sensible to the gifts of God, and particularly to those which come from distant climates, and which from usage have become necessary to us. If we did but reflect upon the labour, the wheels, if I may use the expression, which must be put in motion in the vast machine of the world before we can receive a morsel of sugar or a piece of cinnamon, we should be more grateful for the presents we receive from nature, more alive to the goodness of that Great Being who so amply and so carefully provides for all our wants. We will therefore direct our present attention to the consideration of a few of those exotics which we now denominate necessaries, and which it would cost us some reluctance to relinquish. Perhaps good may result from this investigation; at least we may be excited to look with tenderness upon our unfortunate brethren who are slaves, and to whose toilsome labours we are indebted for many of the luxuries of life.

And first we will begin with sugar. Sugar is in fact the salt particles contained in the juice or sap of a certain reed which is principally cultivated in Brazil and the adjacent islands, but which is also found in abundance in the East Indies and in some parts of Africa. The preparation of sugar does not require much skill, but it is very laborious, and is generally executed by slaves. When the sugarcanes or reeds have arrived at maturity, they are cut and ground in a mill, to press out the juice. The juice is then boiled, for without this it would ferment and turn sour. Four times it is boiled in different coppers, being carefully skimmed all the time, and finally, to purify it, a quantity of woodashes and unslacked lime is thrown into it. It is then poured into moulds, where it dries and attains the consistence of sugar.

Tea is nothing more than the dried leaf of a shrub which grows in Japan, China, and other Asiatic countries. In spring the tea leaves are gathered at three or four different periods. The first crop is the most delicate, and has the finest flavour; this is called imperial tea, and it is never exported to Europe. That which the Dutch sell under this name is from the second crop.

The coffee is the nut of a fruit resembling cherries. The tree which bears it is indigenous to Arabia, but it is cultivated in several hot countries; next to the Mocha coffee that of the island of Martinique is the finest. The fruit in the middle of the nut is called the bean. This bean when fresh is sometimes of a yellow colour, or gray, or greenish. The nuts are spread upon a mat to dry them, and they are afterwards broken with a roller to extract the bean from them. They are then dried again before they are exported.

Cloves are the dried buds of a flower growing on a tree indigenous to the Molucca islands, but which the Dutch have successfully transplanted to Amboyna. This tree is of the size and form of laurel. Its trunk is clothed with a bark like that of the olive tree. Bunches of white flowers grow at the extremity of each twig, and they are shaped like a nail. At first they are of a pale green, then yellow, afterwards they become of a deep brown, such as we see them; and they have a finer and more aromatic scent than the dried fruit of the tree, called le clou matrice.

Cinnamon is the second bark of a tree which grows almost solely in the island of Ceylon. The root of the cinnamon tree is divided into several parts; it is covered outwardly with a coarse grayish bark, but the inner one is red. The leaf bears some resemblance to that of the laurel; the flowers are small and white; they have a pleasing flavour, somewhat resembling that of the lily of the valley. When the tree has attained a certain age, the two barks are stripped off. The outer one is nothing worth; the inner one is dried in the sun, when it rolls itself up in this form, and we see it as cinnamon.

Nutmegs and mace are the product of the same tree, which grows in the Molucca islands. The nutmeg is covered with three coats; the outer one falls of itself when ripe; the second is very thin and delicate, and is most carefully removed, dried in the sun, and is then denominated mace in the Moluccas, but frequently in other places nutmeg blossom. The third coat is then taken off the nutmeg, and the latter is thrown into lime water, in which it remains for some days; thus prepared, it is ready for exportation.

Cotton grows in Asia, Africa, and America. It is enclosed in the fruit of the shrub to which it gives its name. This fruit is shaped like a pod, which opens as it ripens, and discloses its interior snow-white substance; gradually this increases till it attains the size of an ordinary apple. The cotton is separated from the nut by a mill made for the purpose, which throws the cotton on one side and the pod on the other. Olive oil is the juice of the olive fruit, which grows so abundantly in France, Spain, Portugal, and Italy. The juice is pressed out, and the inhabitants of the countries in which it grows use it instead of butter.

Pepper is the fruit of a parasitical plant resembling very much the vine. Its leaves are highly odoriferous, rather of an oval shape. About the middle and extremity of the branches are bunches of white flowers, from which proceed the fruit growing like currants.

The contemplation of so great a variety of foods, calculated not only to please our palates, but also to please our eyes, must bestow much satisfaction upon a thinking mind. Consider, my dear Reader, what a profusion of good things the Almighty has bestowed upon thee. Behold how the most distant countries pour forth their treasures for thy gratification, and canst thou remain insensible to so many blessings, and to the labours of thy fellow creatures who toil to procure for thee luxuries which thou dost so profusely squander? And canst thou forget that God who everywhere spreads a table for thee, and everywhere signalizes his bounty towards thee.

SEPTEMBER 15.

REFLECTIONS UPON MYSELF.

I LIVE, I move, my blood circulates through my veins, and yet I am no agent in these operations. I enjoy the sweets of sleep, and my senses are steeped in a pleasing forgetfulness, yet my soul still exists. When I awake, my senses resume their power, and my soul is refreshed: my ideas become more clear and lively. I eat and drink, and am surrounded by the beauties of nature; I experience a thousand agreeable sensations! Am I the original cause of these effects? And is it I who have laid the first acting principles;—given to my body its power of motion? Did I from nothing call it into being, before I was, or knew what motion meant? And did I arrange the divers parts of my body? I who even now am ignorant of their combinations and relations. How is it that I cannot determine the limits between sleep and watchfulness, or explain the wonders of digestion, which are carried on without my aid? Whence is it that all mankind are formed upon the same principles, and why have I not formed myself differently from my fellow creatures? Have I created the beauties of nature, or are they selfexistent? Who rendered me susceptible of pain and pleasure? Who causes bread to spring from the earth, and water from the stony rock, for my support and comfort? Who sheds floods of glorious light around me, to cheer me on my pilgrimage? From whence proceed the goods of life which I enjoy, and from whence the evils which so oft afflict me? Why do I not enjoy perpetual good, and if I have formed myself, whence is it that imperfection still marks my general state of being? Am I the powerful cause from whence I derive existence; and are my brethren alike endowed with this creative faculty?

Vain and contradictory thoughts! which betray the perverseness of those who indulge them. My soul, with all its imperfections, attests the greatness of the Being who created it! My body, of which I know so little, declares the power of a mighty Artist, whose greatness and wisdom are not to be fathomed by human intelligence. How could man, weak and feeble as he is, imagine, plan, and execute such a masterpiece as the human body, when he cannot even make a representation or copy of the great original? There is no one part of our body which is superfluous; all is harmony and perfection.

This experience has proved. How great then is the power of the Almighty Creator, who has formed millions and countless multitudes of creatures upon the same perfect and intricate plan. These exclaim continually, Behold in me the power of the Most High; pause, O man, and consider the perfection and skill which is manifest in our formation; examine the smallest creature, it lives like thee; like thee it has received motion and sensation. Oh, bless Him who has thus marvellously displayed his power and goodness.

Yes, O my God, my Creator, I will return thee praises and thanksgivings for all thy mercies. To thee I am indebted for health and strength, for the faculties of my soul, and all the pleasures I derive from the numerous creatures which surround me. At thy command the earth brings forth fruit abundantly, and to thy supreme disposal I commit myself for the future. Thou knowest all men; thine eyes are constantly upon them; thou observest all their actions.

God Almighty does not require us to pass our days in gloom and darkness, nor that we should consider our existence a scene of misery: he permits, he invites us to partake of the innocent enjoyments of life with grateful hearts. When the bird lightly skims through the air, warbling his sweet notes, delighting me with the elegance of his form, the rapidity of his flight, shall not my heart spring towards the Creator of all things? Shall not I join in the hymn of praise raised by the soaring skylark? Yon little bird receives its food from the Almighty. It is he who causes the seed to grow, and bountifully provides for its support. It is he who causes the wheat apparently to perish in the ground, and from thence to spring to life for my support. From him the rains descend; from him emanate the cheering sunbeams; while my most strenuous efforts could not produce one single blade of grass.

But the bounty of the Almighty is not confined to the necessaries of life; he also grants us what the world calls riches, fortune, pleasures, the proper application of which procures us so much happiness. Even in the passing events of life, those which threaten ruin are often the source of much real happiness. In short, having formed us with the most admirable symmetry and in the most perfect form, daily and hourly he gives further proofs of his mercy towards us, by his care and watchful tenderness over us.

Ye fleeting hours of this my earthly pilgrimage, hours which are gone never to return, where are ye now? Oh, may I employ those which remain suitably to the end of my existence; that when I shall pass from this transitory state to a better world, I may then be satisfied with the knowledge of heavenly things, and able to penetrate the great mysteries of nature and of grace. May the contemplation of thy wonderful works, accompanied by the power of thy Holy Spirit, excite me to celebrate thy praises, O my Creator and Redeemer! May I glorify thee so long as thou shalt be the King of kings and Lord of lords; the sovereign of all creatures from this time forth and for evermore.

SEPTEMBER 16.

COMPARISON OF THE STRENGTH OF MAN WITH THAT OF ANIMALS.

ALTHOUGH the body of man be externally more delicate than that of most other animals, it is nevertheless exceedingly muscular, and perhaps stronger in proportion to its size than that of the largest and best proportioned animals. For in comparing the strength of the lion with that of man, we should consider that much of the apparent strength of the former must be attributed to his powerful arms, his claws for instance, with which he darts upon his prey, lacerating it by every movement. But there is a more accurate criterion by which we may judge of the relative strength of men and animals. Persons inured to hard labour can without much effort raise burthens weighing one hundred and fifty, nay, two hundred pounds. Porters have been known to carry seven or eight hundred pounds weight; and those employed on the quays at London sometimes carry burthens which would fatigue a horse.

A learned Frenchman made a curious experiment upon the strength of man: he contrived a kind of harness, by means of which he distributed equally a certain number of weights, so that every part of his body bore relatively an equal proportion: by means of this machine a man standing up sustained two thousand pounds without being much oppressed.

The size of a man compared to that of a horse is as one to six or seven; so that if the strength of a horse were equal in proportion to that of a man, he would be capable of bearing two thousand pounds weight without being overloaded, but this is far from being the case.

We may also judge of the strength of man by the agility of his movements and the continued exercise he will endure. Men accustomed to footracing outrun horses, or will at least continue the course much longer; and even in more moderate exercise a man used to walk will go over as much or more ground than a horse for several successive days; and even if he does but equal the horse in the speed, the latter will be worn out by fatigue, while the former is still able to pursue his destined course.

At Ispahan the couriers by profession will travel thirty leagues in ten or eleven hours. Travellers affirm that the Hottentots outstrip lions in the chase, and that the savages of America, in pursuit of an animal as swift as the stag, weary them out and then catch them. A thousand wonderful stories are related of the swiftness of the savages in the chase; of their long journeys performed on foot over the steepest mountains, through the thickest forests, and across the most difficult countries, where no track is to be found. These men, it is said, will traverse the distance of a thousand or twelve hundred miles in the course of six weeks or two months. Is there any animal, with the exception of birds, endowed with muscles capable of supporting such uninterrupted fatigue? Civilized man does not know the extent of his strength; he is little aware how much he loses by indulgence, and how much he may acquire by constant exercise. Occasionally, however, we see, even among ourselves, men possessing extraordinary muscular power; but this gift of nature, which would be so invaluable were it necessary he should employ it in self-defence, is of little or no use in society, where the mind is a more powerful engine than the body, and where labour is not suitable to all men.

These reflections afford fresh subjects for adoring the wisdom of God, who has so admirably formed my body, and rendered it capable of so much activity; and I cannot help looking with pity upon those indolent beings who pass their days in luxury, idleness, and sloth; who refuse to put forth their strength lest they should injure their health or endanger their lives. The Almighty, when he bestowed strength upon man, intended he should make use of it; when, therefore, we consume our time in idle luxury, we are guilty of great ingratitude towards our benevolent Creator. Oh, may I in future employ my strength in the service of my fellow creatures agreeably to my situation in life. Am I not happier than thousands of unfortunate beings who toil from the rising to the setting sun; or those who pass their days and nights in painful servitude or cruel slavery? The greater my happiness when compared with the lot of these poor creatures, the greater will be my efforts to fulfil my various duties. And I will bless God for assisting me in the arduous task, and praise him for ever and ever.

SEPTEMBER 17.

WONDERFUL INSTINCT OF THE BUTTERFLY FOR THE PROPAGATION OF ITS SPECIES.

BUTTERFLIES have at this season of the year very generally disappeared. But is the race completely extinct? No, certainly. This insect still lives in its posterity, and by a wonderful instinct it has securely provided for the preservation of its kind. From the eggs it has laid will proceed a fresh generation. But how will it protect these from the rains of autumn and the cold of winter? Are they not in danger of being drowned or frozen?

That benevolent Being who has taught man wisdom has also instructed the butterfly how safely to deposit and secure its eggs by steeping them in a glutinous matter which exudes from its own body. This gluey substance is of so impenetrable a nature that neither rain nor cold affect it. But it is to be observed that although each species preserves from generation to generation the same method, yet there is a great variety in the plans pursued by different kinds of butterflies for the preservation of their species.

Naturalists inform us that some of these insects lay their eggs at the beginning of autumn, and die soon afterwards upon their future family. The sun, which has at that time sufficient force, hatches the eggs; and, even before winter appears, numbers of little caterpillars are seen: these immediately begin to spin their winter habitation, which is warm and spacious, and in which they pass the cold weather very securely. It is very remarkable that the butterfly, like other insects, deposits its eggs upon those plants only which offer proper food for their young ones; so that these little creatures, when they first emerge from their eggshell, are provided with every thing suitable for their support.

All these circumstances and many others are well calculated to excite our admiration of the preserving providence of the Almighty. But we require miracles, events out of the ordinary course of nature, or we could not fail to be overcome with admiration and astonishment at the wonderful instinct displayed by these insects in the preservation of their species.

Let us, however, benefit from the contemplation of such wonderful foresight, and extend our love to our posterity, and interest ourselves in the good of those who shall come after us. In the projects and enterprises we form, let us not be discouraged by the reflection that death may surprise us before we have accomplished them. Let us remember that we owe our services to the public, and that we should imitate the care and foresight of our ancestors, who looked beyond their own immediate benefit in the formation of many of their plans. Mothers may learn a useful lesson from the butterfly, which by its wise and parental foresight always places its little ones in the most advantageous, the situation most suitable to the wants and necessities of their progeny. We cannot foresee, and therefore we cannot provide against those numerous misfortunes which flesh is heir to; but, at least, we should take great care that the sorrows of our children do not originate in our misconduct. Oh, would to Heaven that parents would consider the future happiness of their posterity; that they would never be so imprudent as to leave their affairs in a deranged state, so that their children might not, after their decease, find themselves plunged in a sea of worldly trouble; strangers perhaps seizing their patrimony, and depriving them even of the ordinary means of subsistence.

SEPTEMBER 18.

THE VINE.

We have only to look at the vine, to pronounce our complaints against the inequalities of the earth to be perfectly groundless. The vine never flourishes in a level country, neither is it upon every hill that it attains perfection, but only upon those which face the rising or midday sun. Hills are the bulwarks of nature, which she invites us to clothe with vines and other parasitical plants. The most barren hills, and all those perpendicular heights where the plough cannot work, are nevertheless covered with the richest verdure, and produce the most delicious of fruits. If the soil which nourishes the vine appears so barren, the plant itself is not more inviting in its appearance. Who would have believed, without experience, that one of the roughest, most brittle, and most useless of woods should produce a liquor so grateful to the taste as wine. And yet the heat which animates the vine is such that the sap is forced through the plant with seven or eight times more force than the blood circulates through the veins of animals. The evaporation of the vine is also so considerable that, in order to replace that nourishment which evaporates by the leaves, fifty-two inches of sap must rise in the stem in the space of twelve hours.

Who is it that has bestowed upon the vine qualities so precious, so superior to the baseness of its origin, to the apparent dryness of its native soil? Who has endowed it with such innate strength that its juice will keep for years sound and unperishable?

And with what wisdom has the Almighty distributed vines upon the earth! They do not succeed everywhere; and in order that they may attain perfection, they must be planted between the fortieth and fiftieth degree of latitude, consequently about the middle of the globe. Asia is, properly speaking, the mother of the vine, from whence it was transplanted into Europe. The Phœnicians, who were the earliest navigators of the Mediterranean sea, carried it to the numerous islands, and the southern parts of France and Spain. It succeeded wonderfully in the islands of the Archipelago and in Italy. Vineyards were soon multiplied in the latter country, and the Gauls, invited by the delicious flavour of its fruits and wines, crossed the Alps, and took possession of the country upon each side of the Po. Soon, however, the vineyards of France became celebrated, and the vine in process of time was cultivated with success on the banks of the Rhine, the Meuse, the Niekar, and in other parts of Germany.

These remarks, my dear Reader, may give rise to many important reflections. As the most barren soils are well suited to the culture of the vine, so the most fruitless countries may be favourable to the prosecution of the arts and sciences. The most sterile provinces have often produced men whose genius has enlightened not only their own, but surrounding nations. There is in fact no country, no desert, no town, no village so contemptible but that certain branches of science may be cultivated in them. They only want encouragement. And what an inestimable fund of good might we not procure to ourselves if we would direct our attention to the culture of the human soul. Ye heads of empires, ye religious pastors, ye instructors of our youth, how much could ye contribute to the happiness of your contemporaries and of posterity, if by exhortations, by rewards, by useful establishments, and other encouragements, you endeavoured to restore wisdom and virtue to decayed cities and ruined villages. Such conduct would ensure us, if not the thanks of our contemporaries, at least those of posterity.

The vine, with its rough and dried wood, resembles those persons who, deprived of external advantages and attractions, possess nevertheless those faculties and inclinations which tend to the good of mankind. How often does it happen that persons born in obscurity have raised themselves, by their good deeds or gallant enterprises, far above the great ones of this world. And at this moment the blessed Jesus himself is before me. Who from his appearance of poverty could have imagined he could have been the instrument of the great and wonderful miracles which distinguished his life, and were so beneficial to mankind? Yet such is the fact. The Saviour of mankind, who, like the rough vine stem, had been planted in a barren soil, bore fruits which have proved a blessing and salvation to the earth. And he has shown us that we may be poor, despised, and miserable in this world, and yet that we may work to the glory of God and the good of our fellow creatures.

SEPTEMBER 19.

DAILY WONDERS PERFORMED BY THE ALMIGHTY.

The whole universe, which day after day displays the same systematic beauty, is a miracle which we have constantly before our eyes. What a world of wonders is this which we inhabit! How great is the variety and beauty of the creatures which inhabit it! What hand but that of the Almighty could have placed the beauteous sun and his surrounding worlds in the vast infinity of space? worlds and suns, whose prodigious size and distance astonish and confound our weak imaginations! Who has prescribed their orbits? Who has weighed them in the balance, measured their respective powers, and established between these innumerable globes and the air in which they float such a happy equilibrium? The vicissitudes of day and night, the revolutions of the seasons, the multitudes of animals, reptiles, birds, plants, and fishes, these are all the work of the Most High. Had we witnessed the creation of all these wonders, what would have been our sensations?

The particular providence of God is a never failing and existing proof of his greatness, power, wisdom, and omnipresence; the constant care of God for us; and that marked protection of which every one must be sensible; the divers means which the God of heaven employs to bring man to himself; the road through which he leads him to happiness; the misfortunes with which he afflicts him to make him know himself; the numerous and humble means which he employs to bring about great events; the wonderful and opposite circumstances which unite to the spreading of the gospel from one end of the world to the other; these are effects and causes which should declare to us most positively the ever acting power of God, and should teach us to exclaim, "This is the work of the Eternal, and it is marvellous in our eyes."

Let us, my dear Readers, be attentive to what is passing around us, and we shall see God everywhere: we shall see that by the ordinary means of his grace he is continually working to our sanctification; that his word is in the midst of us; and that his salutary voice is always audible. Those who refuse to listen to him, who resist his Holy Spirit, and who refuse to yield to his merciful operations would be equally insensible, and remain unconverted, though new miracles were to burst upon their sight.

The man who feels that God has created the world, that he offers him wonders on every side, that he daily and hourly loads him with benefits, and yet can refuse to believe in him, and to love him, and to obey him, that man must be dead to every feeling of good, every noble feeling of the soul.

Oh thou, who hast such daily proofs of God's almighty love, listen to his powerful voice, and pursue the paths of truth. Let not thy foolish prejudices and passions prevent thee from duly celebrating the admirable works of the Most High. Behold this visible world, consider thyself, and thou wilt find ample subject for acknowledging His power who so unceasingly performs such wonders. Absorbed in these vast ideas, and overwhelmed with astonishment and admiration, thou wilt exclaim, "Praise, and glory, and honour be to our God, who is our sovereign Lord and great Redeemer; to God, who alone doeth marvellous things; to God, who fills our souls with joy and peace, who soothes our pains, who wipes all tears from our eyes; to Him be glory and honour now and for evermore."

SEPTEMBER 20.

THE DIGESTIVE POWER OF ANIMALS.

DIGESTION is an admirable and complicated process, which is always going on in our system; yet we seldom give ourselves the trouble of learning what is most remarkable and important in a function so essential to the human body. Well it is for us that digestion may be carried on, though we should never inquire how it is performed; but it is preferable that we should be acquainted with the general process, and have some knowledge of the operations of nature in this respect. The process is as follows.

When the food has been sufficiently masticated by the teeth, and moistened by the saliva, it is then prepared to pass into the throat; and this is the last function relative to digestion in which the will assists: all the rest is done without our being conscious of it, and without our being able to prevent the process going forward. As soon as a portion of food enters the throat, it pushes the mass onward, and causes it to descend into the stomach by a peculiar mechanism, for the weight of the food alone would not be sufficient. Having entered the stomach, the food is there reduced into a soft paste of a gray colour, which after being sufficiently attenuated passes into the duodenum, or first intestine, where it undergoes new changes. Several small vsssels, which proceed from the gall bladder, and from a gland situated behind the bottom of the stomach, and called the pancreas, open into the duodenum, and pour into it the bile and the pancreatic juice, which mingle with the food. There are also in the intestines a great number of glands, which distribute their humours through every part of the alimentary mass. It is after this mixture that true chyle is discovered, and there is great reason to believe that it is in the duodenum that digestion is completed.

The alimentary mass continues its course through the other intestines, where it is continually moistened by the fluids which are secreted in the intestinal canal. The chyle then begins to pass into the lacteal veins, which everywhere open in the intestines, and terminate in a vessel called the receptacle of the chyle, situated near that part of the back where the first lumbar vertebræ begins, and from it the thoracic duct rises and ascends upwards through the chest, passing along the side of the spine, and opens into the left subclavin vein near the internal jugular. The chyle then passes through this canal, and mixes with the blood, enters the heart, and, having lost its white appearance, is distributed through all the arteries of the body.

The aliment not converted into chyle passes downwards by a motion peculiar to the intestines.

From the above slight sketch of the manner in which digestion is performed, we may obtain some idea of the great wisdom which God has displayed in a function so essential and important to our bodily health, our comfort, and our very existence. We should be highly culpable indeed if we were inattentive to it, and if these wonders excited in our hearts no gratitude towards the Author of so many blessings, which we are continually enjoying.

SEPTEMBER 21.

THE SUM OF THIS WORLD'S GOOD SURPASSES THAT OF EVIL.

NOTHING is better calculated to console us in the reverses and misfortunes which may befall us than to admit as a general principle that the world contains more good than evil. Let us question the most miserable of men, and ask if he can enumerate as many subjects of complaint as of thanksgiving: it will be found that, however great his misfortunes, they are not to compare to the multitude of benefits which he has received.

In order to be fully sensible of this, calculate the great number of days you have passed in good health, and then enumerate those which have been marked by bodily suffering. The troubles and anxieties of your domestic and even public life do not at all equal the pleasures and comforts you have enjoyed in them.

Count, if you can, the agreeable sensations which spring from our senses;—count the pleasures which are the portion of every age, state, and profession. Enumerate the gifts which we receive from nature, and those which result from human industry. Think upon those moments of delight which are the consequence of an escape from some great danger;—of a victory over ourselves, or the performance of some noble deed and virtuous action; and, having thus recalled to your mind those moments of happiness, remember that you can recollect but the smallest portion of your happiness. It is the constant good by which we are surrounded which makes us so sensitive to evil; that the recollection of our early prosperity is effaced by succeeding hours of happiness, and that if our ills are more profoundly engraven on our hearts than the good which we receive, it is precisely because the former are more uncommon. In this comparison between good and evil, you should not place those afflictions from which good has resulted; neither should you enumerate those which are destined to render you better Christians, and consequently happier. In this comparison between good and evil, you should only rank among the latter those misfortunes which appear to you really such, and from which, according to your weak judgment, nothing good can proceed. I am very sure that if you will calmly and coolly examine these two points, you will find that good surpasses evil.

But how is it that man is so little inclined to acknowledge the continual proofs he receives of the goodness of the Almighty? Whence is it that he loves to view things through the medium of evil, and why does he torment himself with vain fears? Has not the divine Providence surrounded us with agreeable objects? Why are we then inclined always to dwell upon our infirmities, upon our wants, or misfortunes? Why do we magnify the latter, and obstinately close our eyes to every thing which might tranquillize or console us. But thus it is. The misfortunes which befall us wholly take possession of our thoughts and feelings, while days and years of happiness pass silently and unheeded by. Oh, let us renounce this foolish mode of conduct, so calculated to make us miserable. Let us be convinced that the Almighty has impartially shed his gifts throughout the earth, and that there is no man, however seemingly unfortunate he may be, but has great cause to sing praise and glory to God. "Blessed be the Lord my sovereign good, who fills my heart with joy, even in moments of sorrow and affliction; who cheers my soul by prospects of immortality and bliss. He conducts us by secret paths to these scenes of glory. And the trials which from time to time he sends among us, these tend to future good, of which, at some future time, we shall be well convinced. His paternal care suits our trials to our strength, and his watchful eye is ever on us for our good."

SEPTEMBER 22.

OF THE CONSTANT WARFARE IN THE ANIMAL CREATION.

THERE is a constant state of warfare carried on in the animal world. The three elements, earth, air, and water, may be considered as fields of battle to them. The eagle is the terror of the aerial inhabitants; the tiger, of those upon earth; and the pike in the waters, and the mole within the earth, commit their carnivorous ravages. In these animals it is necessity which impels them to prey upon each other; but there are animals in which this is not the case: in them their ravages proceed from a natural antipathy only.

When the ermine springs from the ground, and attaches itself to the ear of the bear and the elk, lacerating it with its sharp teeth, it cannot be supposed that this action proceeds from any intention to make the bear its food. But as far as regards this rapacious propensity, there is no animal whatever which does not serve as food to some other animal.

I am aware that there are persons in the world who think this arrangement cruel and capricious. But I hope to prove that even these enmities and these antipathies furnish an excellent example that all is as it should be. If we take animals collectively, it is highly advantageous to them that the one should serve as food to the other; since if this were not the case, each race of animals would increase to so prodigious a degree as totally to overrun the earth. Insects, and many reptiles, feed upon carrion; others live in the skins of birds and beasts; and these again, small as they are, serve as food to other animals. Some creatures multiply so exceedingly fast that if it were not for this law of nature, they would become so numerous as to be a great nuisance. If it were not for the sparrow tribe, how would the insect race increase, and what would then become of our fruits and flowers? Without the ichneumon, which, as naturalists affirm, seeks for the eggs of the crocodile and breaks them, to what a powerful and fearful degree would the numbers of these noxious animals multiply.

A great part of the earth would be desert, and many animals would cease to exist, were there no carnivorous creatures. Perhaps it may be said that the vegetable kingdom could supply them with food: but if that were the case, our fields could scarcely suffice for the sparrows and swallows; besides which the bodies of carnivorous beasts must undergo a total change. And how would fish find nourishment unless the seas contained it for them in other fishes. Animals would lose much of their vivacity and agility, were it not for this spur to action offensive and defensive. Creation would become less animated, for man himself would have fewer incentives to exert his energies if every thing were tame around him. Much of the sagacity of animals, their agility, and wonderful instinct, arises from the necessity of providing for their own safety; and these display the wisdom of the great Creator of all things.

Who then shall dare to question the omniscience of the Almighty in this arrangement, since it throws fresh lustre on his perfections. Agreeably to the system of the world as it now is, one animal was destined to prey upon another. If indeed one species was totally extirpated by this plan, we might complain; but this is not the case: on the contrary, the most perfect equilibrium is maintained between them. Carnivorous animals then form an indispensable link in the great chain of creation; but their number is few when compared to that of other animals. It must also be observed that in general they possess less address and less skill than those animals whose preservation depends chiefly upon the exercise of these qualities. The latter also possess more exquisite senses, more swiftness and cunning than beasts of prey.

Who is there that does not confess the wisdom of the great Creator in this wonderful arrangement? And if our limited understandings could penetrate the great mysteries of nature— But this knowledge is reserved for a future state, when all things shall be made clear to us.

Yet even here we can comprehend in part the utility and good resulting from this law of nature. But that which should surprise us more is, that, among a more noble being, man, should prey upon his fellow, and delight in war and rapine. Alas! we must confess, to the disgrace of man and Christianity, that there are beings who pursue their fellow creatures with a ferocity equal to that of the beasts of prey. And yet it is God's command that every man should lead a life of peace and virtue; that he should love his fellow, and, like a tutelary deity, should prove himself the benefactor of mankind. Let us not traverse these merciful designs of Providence, but apply ourselves to the culture of every peaceful virtue. Let beasts of prey destroy each other, but grant, O my God, that we may follow the example of love set by our blessed Redeemer Jesus Christ, and endeavour, to the utmost of our power, to contribute to the good of all mankind.

SEPTEMBER 23.

MORAL UTILITY OF THE NIGHT.

The days now begin to grow shorter, and the nights to lengthen: and how many persons are there who find fault with this arrangement of nature! They perhaps secretly wish there were no nights at all, or at least that they should never exceed in length those of June and July. But these wishes are unreasonable, and betray our ignorance. If, however, we would give ourselves the trouble to reflect a little upon the advantages which result from the vicissitudes of day and night, we should not be so precipitate in our judgments, neither should we make such childish complaints; on the contrary, we should acknowledge the goodness of the Almighty in bestowing upon us day and night alternately.

Of the moral utility of the night, it may be said to interrupt the course of many vices, at least of those most fatal to society. The darkness of the night compels the evil minded man to seek repose, while suffering virtue finds at the same time a relaxation from her toils. The unjust and fraudulent dealer ceases, during the night, to cheat his neighbour; and the approach of darkness gradually puts an end to a thousand other disorders. If man could keep awake double the time he now can, to what an extent would bad actions of every description be multiplied. The wicked, from the constant and uninterrupted habit of sinning, would become frightfully inured to all manner of wickedness. In short, we may safely say that the longer the nights are the fewer crimes are committed in the space of the twenty-four hours: and this is surely not to be classed among the least of the benefits of night.

Of how much instruction, of how many pleasures should we be deprived if the night were to cease to be. The wonders of the starry heavens would be lost to us. But now that every night declares the majesty of God in the brilliant firmament, we can raise our hearts to him with awe, deeply impressed with our own nothingness. And if we should delight in every opportunity which recalls the Almighty to our wondering minds, how greatly should we appreciate the night, which so gloriously proclaims the powers of the Omnipotent. Oh, if we would but be attentive to these advantages, no night would be too long for us: on the contrary, one single night spent in meditating upon the works of God would produce the most salutary influence upon our lives. Let us then henceforth contemplate with attention the immense theatre of God's works which night unfolds to us. One single good thought to which this grand spectacle shall give rise; this, though the last when sleep overtakes us, and the first when refreshed by his genial influence, we rise to hail the returning day, this thought, I say, shall, if encouraged during the day, prove of the greatest utility to our minds and hearts.

The night, to those who love to reflect upon themselves, is very generally the source of infinite happiness. The tumult and dissipation which surround us during the day leave but little time for self-recollection, or leisure to detach us from this world or to occupy ourselves with thoughts upon the high destiny we shall be called upon to fulfil. But the stillness of the night invites us to meditate upon these sublime subjects. We may then, without interruption, commune with our own hearts, and acquire that most important of all knowledge, the knowledge of ourselves. The soul may then collect its powers, and direct them to the consideration of those objects which most conduce to its happiness. We may then effaoe those evil impressions which we have received in our intercourse with the world, and arm ourselves against the vices of the age. The tranquillity and solitude of our closets favours religious thoughts, and inspires us with the inclination to occupy ourselves daily in them. All those nights which the Almighty shall please to bestow upon me shall in future be devoted to these pious reflections. Far from murmuring at the vicissitudes of day and night, I will laud and bless the Almighty for them, and praise him for the opportunity which night confers, of better understanding the glory of God, and those things which work for my eternal salvation.

SEPTEMBER 24.

UPON THE INDIFFERENCE WE MANIFEST TO THE WORKS OF NATURE.

Whence is it that we display so much indifference and so much coldness to God in the works of nature? The answer to this question may give rise to divers important reflections.

One of the causes of this indifference is inattention. We are so accustomed to the beauties of nature that we refuse to admire the traces of wisdom they unfold; and secondly we are not sufficiently grateful for the numberless advantages we derive from them. Too many persons resemble the beasts of the field, which feed upon the rich pasture, and refresh themselves at the limpid stream without at all inquiring from whence he derives these blessings, and without acknowledging the bounty and goodness of Him from whom they are derived. Thus man, although endowed with most excellent faculties, and thus most capable of enjoying the benefactions of nature, seldom thinks of the divine source from whence they emanate. And even when the wisdom and goodness of God are most manifest, they make but little impression upon him, because by habit he is so accustomed to them that he becomes indifferent and insensible instead of being overwhelmed with gratitude at their constant repetition.

Many persons are insensible to the beauties of nature from ignorance. How many are there who have not the slightest knowledge respecting the most ordinary phenomena of nature! Daily they see the sun rise and set; their fields are moistened by gentle rains or genial dews, and sometimes by thick falling snows: the most wonderful operations are carried into effect every spring; but they have no curiosity which excites them to inquire into the cause of these wonderful transformations. It is very true that there are a thousand things which must ever remain incomprehensible to us, however deeply we may study to fathom them; but we may at least discover an historic knowledge of them: and the most common labourer could, if he would take the pains to reflect upon the subject, inform himself how the seed he sows shoots and puts forth leaves.

Others disdain the works of nature, because they are completely occupied with their own worldly affairs. I am convinced there would be more attentive observers of nature if spiders spun threads of gold, if the crab contained pearls, and more particularly if the flowers of the field had the faculty of restoring old age to youth. We estimate every thing as connected with our wants and interests. Those objects which do not immediately gratify our inordinate desires are unworthy of our attention. Our self-love is so unreasonable, and we so little know our true interests that we disdain those things which are most useful to us. Wheat, for instance, is one of those plants which mainly conduces to our subsistence, and yet we see whole fields waving like a sheet of gold with the ripened corn, without scarcely noticing the glorious sight.

Many persons neglect the contemplation of nature from idleness. They are too fond of repose and ease to contemplate the starry heavens; neither can they quit their downy couch to hail the approach of rosy morn; they would be too much fatigued if they stooped to view the wonderful display of art, which is so manifest in the growth of a field of grass. And yet these same persons, who are so attached to ease and idleness, will rouse to the greatest energy when they wish to gratify some darling passion. The drunkard and the gamester would endure almost a martyrdom, were they compelled to quit their favourite pursuit to gaze upon the starred vault of heaven. A man who is fond of walking would go several leagues on foot to see a friend, but would think his time ill spent to walk two miles to inspect a singularity in nature's works.

Many, from irreligious motives, treat with contempt the works of God. These care not to know the greatness of the Almighty's power; they have no taste for piety nor for the obligations it imposes. To praise God, to love him, and to acknowledge his benefits, they consider a painful task. We are but too well authorized to believe that this is one of the principal causes of the indifference of men for the works of God. If they prized the knowledge of God above all other knowledge, they would seize, with eagerness and pleasure, every opportunity of strengthening themselves in wisdom and the love of their Creator.

Two thirds perhaps of the inhabitants of the earth may be ranged in the divers classes we have mentioned. It is but too certain that there are few persons who take delight in studying the works of God. This is indeed a melancholy truth, of which we have hourly proof. Would to Heaven that we could be convinced how ill it becomes rational beings to be so insensible to the effects of the wonder-working hand of the Almighty, and how we degrade ourselves by this mode of conduct, which levels us with the brute creation. What, shall we shut our eyes on the many wonders which surround us, or close our ears to the great hymn which all nature chants to the praise and glory of God? What, do we wish to contemplate God hereafter, and refuse to view him here below in his omnipotent works? Ah, let us renounce this criminal indifference, and seek after that joy which inspired the holy psalmist David when he contemplated the magnificence of the works of the great Creator.

SEPTEMBER 25.

UPON DIVERS NOCTURNAL PHENOMENA.

When the weather is tolerably serene, we often observe a circular light round the moon; this light is called halo or crown. Its external edges sometimes feebly display the tints of the rainbow. The moon appears in the middle of this luminous circle, and the intermediate space between it and the halo is generally of a darker hue than the other parts of the heavens. When the moon is full and very much elevated above the horizon, the ring is very bright. It is often of a considerable size. Now we must not suppose that there is actually a ring of light surrounding the resplendent queen of night; the cause of this bright crown must be traced to the state of the atmosphere, the vapours of which refract the rays of light as they pass through it, and thus produce this singular phenomenon.

Sometimes more moons than one have been

observed surrounding our own sweet planet; these are called paraselenæ. These phenomena have the same apparent size as the actual moon; but their light is less resplendent. They are generally accompanied by circles of light, some white, some variegated like the rainbow, and many of them have long brilliant tails. All these illusions are produced by mere refraction.

The light of the moon, falling upon aqueous and sometimes frozen vapours, is refracted and separated into divers coloured rays, which reacting, they present to us the appearance of other moons. Sometimes, but very rarely, a beautiful lunar rainbow will appear after a violent shower of rain. This meteor is also occasioned by the refraction of the moon's rays.

When the superior atmosphere is loaded with sulphureous and other igniting vapours, we may often see long darting streaks of light; sometimes these collect into a mass, burst, and seem to fall to the earth, assuming a globular form, and we then call them falling stars. It is the popular opinion of the vulgar upon this subject, that these luminous spots are really and truly stars changing their place. Occasionally these apparent stars appear large, brilliant, and coloured; they descend slowly till they reach the lower regions of the atmosphere, and are there extinguished. But large globes of fire, more brilliant than the full moon, have been produced by these igneous vapours; these traversing the air with rapidity, often exploding with a noise; at other times they disperse so high above us that they seem to vanish without concussion.

Summer lightning is another of these beautiful and harmless phenomena. This is distinguished from what we call lightning properly, in that it is not accompanied by thunder. These harmless fires are in fact too far distant from us for their thunders to reverberate upon our feeble ears.

The flying dragon, the dancing goat, the burning brand, and several other meteors owe their whimsical names to the forms under which they appear. Naturalists have by certain preparations produced luminous figures of the like appearance.

But of all nocturnal phenomena, the aurora borealis is perhaps the most remarkable and the most brilliant. It is visible, in fine and serene weather, when the moon gives not her full light, from the beginning of autumn till the commencement of spring. About midnight, a light like that of the dawn of day is often observed; sometimes long streaks of light appear and disappear rapidly, and light clouds flit and sport in every direction. But when the aurora borealis shines forth in all its beauty, its effects and symptoms are far more decided. When the weather is calm and serene, a dark spot is observed in the north, the exterior and superior boundary of which is surrounded by a luminous arch, from whence issue rays of light, long darting streaks, majestic and resplendent columns, which, as they rapidly succeed each other, become red and yellow; these condense, and separate in alternate and dense clouds, ending generally in a display of white, blue, golden, and purple crowns: at these times, this phenomenon presents a most splendid spectacle.

How great, how incomprehensible is the majesty of God! The night proclaims his power; and yet I lament that its reign is now about to be prolonged, although it presents to me such brilliant spectacles.

The phenomena we have just described renders the night not only supportable but agreeable to the people of the north. And if we would but observe with an attentive mind those wonders which even our short nights disclose, we should find ample subject of delight and pleasure. Let me then, therefore, not only direct my senses, but my heart to the contemplation of things above me. I will dart forward far beyond the sun, and moon, and stars, till I find at last the throne of the Most High; there, prostrate at his mercy seat, I will adore in silence. For thou art great and wonderful, O Lord! The silent night declares thy power, and the brilliant moon, traversing the deep blue ether, loudly chants thy praise and honour. The twinkling stars unite their genial influence, and proclaim the divinity of the hand that made them; and the rosy morn, ushering in the glorious orb of day, calls on all nature to join the choral hymn of praise.

SEPTEMBER 26.

WONDERS DISPLAYED BY THE INSECT TRIBE.

Among those insects which peculiarly display the fatherly care of Providence for the preservation of its species, the Walking Leaf is conspicuous. It is a native of the West Indies. Its body is flat, of a brownish red colour, like that of some kinds of dried leaves, but in the spring it is green. The egg from which it proceeds is green, and the little insect, when it first emerges from its shell, is no bigger than an ant. The wings of this curious little creature are of a bright green, having fibres running from that part which lies on the back to the outward edges; when these close, which they do horizontally, they impart to it the resemblance it has to one large leaf; and hence its name: but from the fore part of the body issue four smaller wings, which are also shaped like leaves, and the appearance of the walking leaf in this state is therefore well calculated to give the insect its curious appellation.

The West Indies claim indeed many insects worthy of our attention, either from their peculiar beauty or some other quality which entitles them to our serious consideration. Among these we cannot omit the fire fly. Yet this little insect, which at night shines with so splendid a light, conceals itself in the daytime in rotten wood, as if conscious of its mean appearance, which is that of a dirty looking beetle. But their effect upon a dark night is really sublime, particularly when they attach themselves to the broad leaves of the cocoa tree; these, waving gently to and fro when thickly studded with the fire fly, glittering like living stars, present a sublime object. They are fond of lighting upon new made graves, and earth freshly turned up. They are sometimes caught, and kept in gauze cages, but seldom live longer than three weeks in a state of confinement. The most light proceeds from beneath their wings, and its strength depends upon the health of the insect. They are first seen in May, and continue visible every evening through the summer.

The Martinico Spider is a curious insect, though at the same time we should think them exceedingly disagreeable. The body is composed of two parts, the hinder one as big as a hen's egg, the fore part not quite so large, both covered with long soft hairs. In the middle of the back there is an orifice, the size of a small pea, covered with long hair likewise, from which proceed ten legs, five on each side, longer than a man's finger, covered with hair, and armed with a pair of sharp nippers. Their mouth is also furnished with teeth, of a horny substance, half as long as a common pin, and crooked at the end. They have two black eyes, not larger than a pin's point. The bag in which they lay their eggs is as big as an ordinary hen's egg, resembling leather externally, but within it is as soft as silk. This egg, although so large, they carry about with them under their bellies wherever they go.

And who would suppose that cochineal, which has so strong a resemblance to a red berry, were an insect; an insect too of so much value that Spain is said to have derived more advantage from the cochineal trade than from all the produce of its gold mines. The cochineal insect is of a beautiful red colour; it is much cultivated in Mexico and South America; it feeds upon the plant coctus cochenillifer and the coctus opuntia. When the female is fully grown, it attaches itself to the leaf of these plants, and envelops itself in a white cottonlike substance, which it is supposed to spin through its proboscis in a double filament. The male is a small, and rather slender, active fly, about the size of a flea, with jointed antennæ and white wings, large in proportion to his body, which is of a red colour. When the hen has laid all her eggs, she becomes a mere husk and dies. The insects, when picked or brushed off the leaves, are killed by the steam of hot vinegar or smoke, and the precious dye is then collected, and exported to Europe.

Wonderful are thy works, O Lord! in wisdom hast thou made them all.

SEPTEMBER 27.

OF AMPHIBIOUS ANIMALS.

INDEPENDENTLY of quadrupeds, birds, and fishes, there is another race of animals which are capable of existing either upon land or in water, and which are called amphibious. The blood of these creatures is cold; their features, if we may so use that expression, are mournful and repelling; their colours dark and gloomy, and their voices hoarse and croaking; many of them are also very venomous. Instead of bones they have gristles; their skins vary, some are covered with a smooth leatherlike skin, others with shells or scales. They sometimes hide themselves, and live in noisome places. They are viviparous and oviparous: the latter never sit upon their eggs, but expose them in the sun, or deposit them in water; some indeed lay their eggs in dungheaps. They are mostly rapacious animals, and seize their prey either by force or stratagem; they support hunger for a length of time, and in general lead a trying life.

They are also divided into another class, for some have legs and walk, while others crawl. In the first class tortoises rank; they are covered with a hard shell forming a buckler. The land tortoises are the smallest; the sea tortoises are, some of them, fifteen feet long, and they weigh eight or nine hundred pounds.

There are also divers kinds of lizards: some are smooth skinned, others are scaly; while a third class possess wings, and hence are called dragon lizards. The crocodile, the chameleon, which can live six months without food, the salamander, which has the property of resisting for some time the effects of fire, from the cold and slimy liquid which it exudes from all parts, and which extinguish the flames; these rank in the first class, having legs. Of all these animals, the crocodile is the most formidable. These creatures, which issue from an egg no bigger than that of a goose, attain an enormous size, for they sometimes measure between twenty and thirty feet in length. They are voracious, cruel, and cunning.

Serpents belong to the second class of amphibious animals. They have no feet, but they move along in sinuous and vermicular movements by means of scales and rings, with which their body is covered. Their vertebræ is also of a particular construction, calculated to facilitate this peculiar motion. Several serpents have the faculty of attracting or fascinating birds and small animals, upon which they prey: seized with terror at the sight of the serpent, and perhaps overpowered by the venomous exhalations which they exhale, they have no power to flee, but fall into the wide stretched mouth of their enemy. As the jaws of serpents are capable of great extension, they sometimes swallow animals larger than their own heads. Several of these creatures are armed with what resembles their teeth, but which are in fact small darts, which they can at pleasure protrude or contract: and it is through these they eject their venom, which is contained in a small bag at the root of them, into the wounds they make. This poison has the singular property of affecting wounds only; when taken internally, it is by no means pernicious. Poisonous serpents amount but to one tenth part of their species. The bite of the rattlesnake is more dangerous than that of any other. It is generally three or four feet long, and about as thick as a man's thigh. Their smell is very offensive; and this disagreeable quality seems given to it, as well as its rattle, to warn mankind of its approach. When pinched by hunger or drenched with rains, this animal is absolutely furious. His form of attack is that of a circle, from which he springs till he rests solely on his tail: and the whole of this operation is instantaneous.

Possibly some of my readers will exclaim, But why has the Almighty created these animals, which appear to be formed merely to torment and destroy mankind? This question arises from our selfish feelings, and shows how ready we are at all times to question the wise decrees of Providence. But if our anxiety upon this subject arises from the pleasure we have in endeavouring to trace and comprehend the works of God, such a disposition is highly laudable, and to this class of readers I now address myself.

It appears to us, perhaps, that lizards and serpents have no connexion with the general good of the world. But this judgment is precipitate, for of this we may rest fully assured, that since they are the production of an all wise and all merciful God, they cannot fail to possess some latent quality, from which good, though unseen, infallibly springs. What that good is, we are not permitted at all times to discover; but we should in silence reflect upon the perfections of the Lord, nor presume to question the decrees of that Being whose divine attributes are omniscience, omnipotence, and omnipresence.

SEPTEMBER 28.

PERFECTION OF GOD'S WORKS.

WHAT can be compared to the perfection of God's works, and who shall declare the power they manifest? It was not sufficient that we should be overwhelmed with their magnitude, their multitude, and their variety, but we were to be amazed and lost in the contemplation of the wonderful art they display; of the individual perfection, regularity, and order which we may discover in the most minute as well as in the most stupendous of God's works. We are astonished, and with good reason, at the different arts which we discern in modern times, by the aid of which mankind execute works that would have been deemed supernatural by our ancestors. We can measure the height, the depth, the breadth of bodies; we can trace the course of the stars; we direct the course of rivers; we can at pleasure raise or depress the liquid element; we construct vast floating buildings, which traverse the foamy deep far from the sight of land; and we accomplish many other ends equally honourable to the human understanding. But how do all the inventions of man, his most magnificent, his most mighty achievements dwindle into nothing when compared with the smallest of the works of the great Creator of man himself, and the author of his noblest endowment, his reason. How weak, how vain are man's imaginations! Let the most skilful artist view but through a microscope his most laboured masterpiece; that upon which he has lavished his restless days and sleepless nights; that which he has touched and retouched; that which his fond imagination pronounces the most perfect, the most polished of its kind, and what will he behold? That his work is rude and unfinished, that it is irregular in form, and lacks proportion; that its smooth surface is rough and uneven, and in short that it is any thing but what it seems to be—perfect. How different is the result of a microscopic examination of the productions of the God of nature! Every object indeed assumes a new form, but it is only to declare new beauties, new wonders, new systems, all perfect, all correct, and all evidently and irresistibly proclaiming the divinity of the hand which made them.

Such is the power of infinite wisdom. Through the whole region of animate or inanimate nature, all is order and regularity; no one link is wanting in the great chain of the universe; every thing is perfect in its kind, considered either connectively or separately in its individual parts. Look but at the innumerable beauties, the varied charms, the harmony of colours, the lovely hues displayed by the swelling hills, the umbrageous woods, the smiling valleys, and the towering mountains!

Great as is the variety of form unfolded by the inanimate world, how far is it excelled by that of animated nature. What then must be the power of that Being who, by a single act of his will, called them into existence.

But, in order to estimate the greatness and power of the Almighty, it is not necessary that we should revert to the far distant period of creation. Every revolving year displays the wonders of his creating hand. The reviving beauties of spring, perfected by brilliant summer, fade gradually in yellow autumn, till numbed by the icy hand of winter, they seem to die; but again, the revivifying spirit walks abroad and bids them live, breathing sweet perfumes, and clothe sweet nature with her embroidered robe of verdant hue.

But whence is it that we so often view these wonderful transformations without feelings of the deepest veneration for the Most High? Oh that we could never enjoy the balmy fragrance of the lovely spring without such pious thoughts. Is not the almighty power as manifest in the works of nature as in the divine revelation of his holy spirit? When I repair under the shade of a luxuriant tree, when I view an enamelled meadow, a gloomy forest, or the waving fields of corn; when I wander amidst the gay parterres and pluck a lovely flower, then I will remember it is God who has given to the tree its foliage, to the flowers their beauty and their perfume, to the verdant meads their velvet covering; that it is he who causes the earth to bring forth corn and oil to refresh man's heart, then with a heart swelling with tender emotions I will exclaim, "Great and numberless are thy works, O Lord! in wisdom hast thou made them all; the earth is filled with thy bounty."

SEPTEMBER 29.

FRUITS.

We have now arrived at that season of the year when the divine bounty so profusely showers upon us fruits of all kinds. The charms of summer have yielded to more solid pleasures, blooming flowers have passed away, and are replaced by the most delicious fruits. The golden apple weighs down the branch which bears it. The melting pear, the luscious plum invite the hand to pluck them. Should we not be highly inexcusable if good and pious thoughts did not arise from the contemplation of all these good things which the munificent bounty of the Almighty has bestowed upon us?

With what wisdom has God distributed the fruits of the earth! and although it is in summer and autumn that they are most abundantly bestowed, yet by the gift of reason he has taught us to preserve many of them uninjured till the early fruits again appear. About the month of June, nature supplies us with rasberries, gooseberries, currants, and common cherries. In July, our tables are supplied with cherries, apricots, and some kinds of pears. The month of August is prodigal of its gifts; figs, cherries, peaches, &c. &c. are then abundant; and in September late cherries and pears, grapes and apples; October too produces a variety of pears and apples, and the delicious fruit of the vine. Thus does nature economize her gifts, thus procuring for us a successive variety of pleasures. As winter approaches, these fruits gradually disappear; and this arrangement was wisely decreed by Providence an incentive to our activity for the preservation of many kinds for our winter use.

How profusely has the Almighty supplied us with this delicious food! notwithstanding all the depredations of birds and insects, it is seldom that we find any scarcity. Look at the prodigious quantity of fruit which a tree will bear in one favourable year! and whence does this abundance arise? not assuredly from the necessity of propagating their several kinds, but to procure a wholesome and delicious nourishment for man. The poor man need not envy the highly seasoned dishes of the voluptuary when his own little garden bestows upon him the apple, pear, cherry, &c. &c.

There are few nutriments more wholesome than fruits. And it is a mark of the infinite wisdom, as well as fatherly care of Providence, that they are most abundantly supplied, not only when they are more agreeable, but most beneficial to us. Apples temper the heat of our blood, and refresh the stomach and intestines in the heats of summer. Plums possess a grateful acid united to the most delicious sweetness, which tend to mollify the asperity of the juices; and if peaches, apricots, and melons are, as some people say they are, their hurtful qualities are not in the fruits themselves, but either from an immoderate use of them, or their uncongeniality to our colder climes.

Nothing is indeed so delightful, so agreeable, or so grateful to our taste as fruits. Every different kind has its peculiar flavour, and this diversity greatly enhances their value. But in this as in every other department of nature God Almighty has considered not only the support, but the gratification of his creatures.

Oh let me never be insensible to the goodness of my heavenly Father in his bountiful dispensation of fruits to us poor dependant mortals. Let me consecrate myself to the service of so tender, so powerful a Being! how great will be thy pleasure, how boundless thy satisfaction resulting from this devotion to his service even in this life! and what boundless, what aspiring hopes may you not indulge for the future.

SEPTEMBER 30.

SONG OF PRAISE, IN IMITATION OF THE 147TH PSALM.

PRAISE the Lord, for he is very powerful! he counts the number of the stars, he calls them by their names. Praise him ye heavens and ye earth, for his name is great and glorious; his sceptre governs with majesty; oh praise the Lord!

Let us unite in praising the God of mercy. Ye fainting souls, approach, come to your heavenly Father, for he is kind and merciful: every thing declares to us that he is the God of love and forgiveness.

His sky is overshadowed with clouds, but it is to water the earth with refreshing rains. The fields are covered with verdure, the grass grows, the fruit ripens; for from the clouds descends the benediction of the Most High. Ever bountiful is the Lord Almighty.

Let every thing which lives praise the Lord! Ye birds and fishes, ye four footed beasts and insects unite your song of praise, for ye are all the object of his care; ye are all nourished by his gifts. Laud ye the name of your God.

Oh how tenderly he cherishes those who love and put their trust in his bounty! Man cannot always help man; neither, had he the strength of a giant, could he always extricate him from danger. Woe, woe to the mortal who seeks for vain help! Oh rely upon the rock of ages, he is thy Saviour.

Oh bless him for declaring his will; for announcing to us his laws and his precepts. His word is the source of life and salvation. O ye people of his, how great is your happiness! praise, celebrate, and exalt the God of truth!